DIESEL PROGRESS

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

FIVE DOLLARS PER YEAR

AUGUST, 1951

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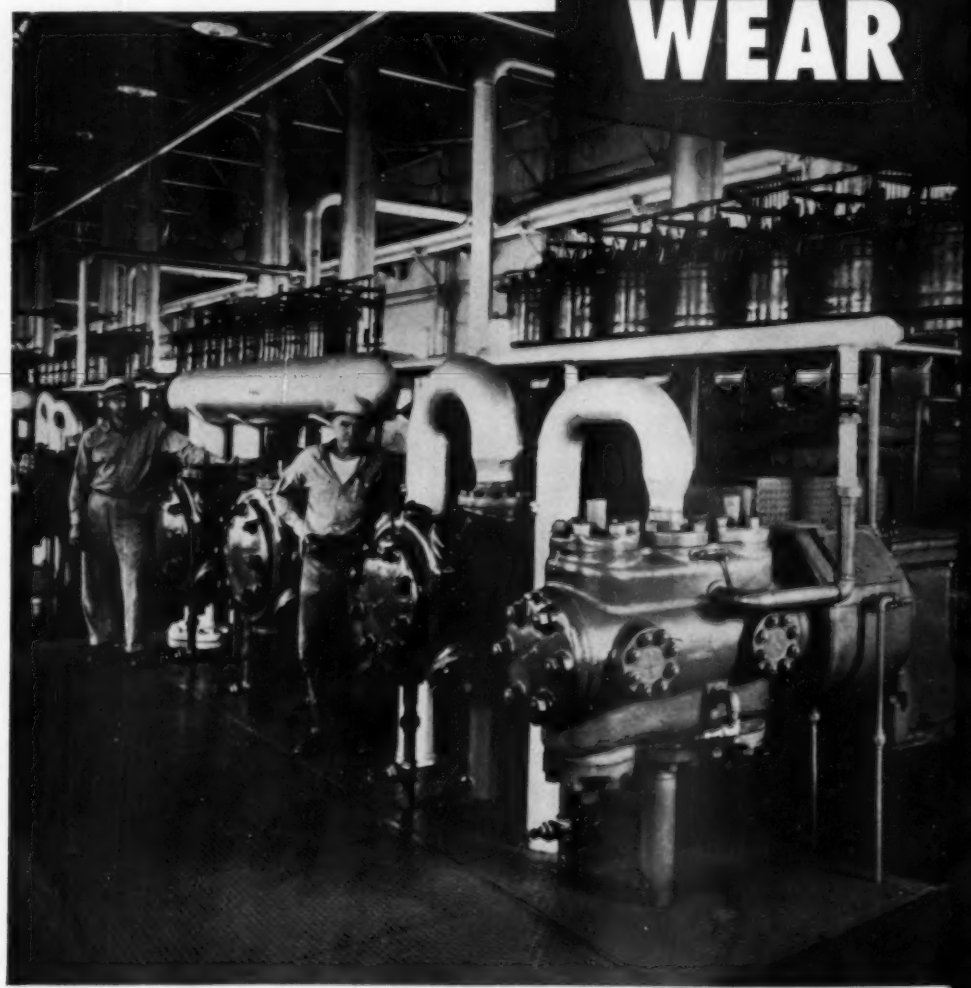

TEXACO

TEXACO

DIESEL PROGRESS for August, 1951, Volume XVII, Number 8. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 816 North La Cienega Boulevard, Los Angeles 46, California. Rex W. Wadman, President. Subscription rate: $3 per year, single copy 30c. Acceptance under 34.64, P. L. & R., authorized.

3/10,000 INCH PER 1,000 HOURS OPERATION

Gas engines protected with TEXACO URSA OIL

This convincing evidence of outstanding performance—only .0003" wear of cylinder liners per 1,000 hours of operation—is reported of an Oklahoma company.* It applies not to just one, but to a large number of Clark RA 6- and 8-cylinder gas engines lubricated with *Texaco Ursa Oil*. Such performance is outstanding but not exceptional, because *Texaco Ursa Oils* give maximum protection against wear in all types of engines—Diesel, gas or dual-fuel—under all operating conditions.

Texaco Ursa Oils resist oxidation and stand up under heat and pressure. Rings stay free, ports stay open and valves active. This adds up to better compression and combustion . . . more power—lower fuel consumption and maintenance costs.

Available in every needed viscosity, *Texaco Ursa Oils* are approved by leading engine builders. These oils are easily America's favorite. In the Diesel field, for example:

More stationary Diesel h.p. in the U. S. is lubricated with Texaco Ursa Oils than with any other brand.

A Texaco Lubrication Engineer will gladly help you step up efficiency throughout your plant. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

*Name on request

URSA OILS FOR ALL DIESEL, GAS AND DUAL-FUEL ENGINES

for Quiet Compressor and Engine Operation in Your Plant and Community

Install Burgess-Manning Snubbers

• You can help build good will in your plant and community by quieting the annoying roar of engine exhausts and the throbbing pulsations of compressor intakes by installing Burgess-Manning Snubbers on the engines and compressors in your plant. These Snubbers, perfected by almost a quarter century's intensive research and broad practical field experience, reduce noise effectively by converting high energy "slugs" of exhaust gases and incoming pulses of intake air to a smooth continuous flow.

Sound engineering recommendations; a quality product, rugged in construction, reliable in operation; guaranteed performance . . . are available to you when you consult Burgess-Manning engineers.

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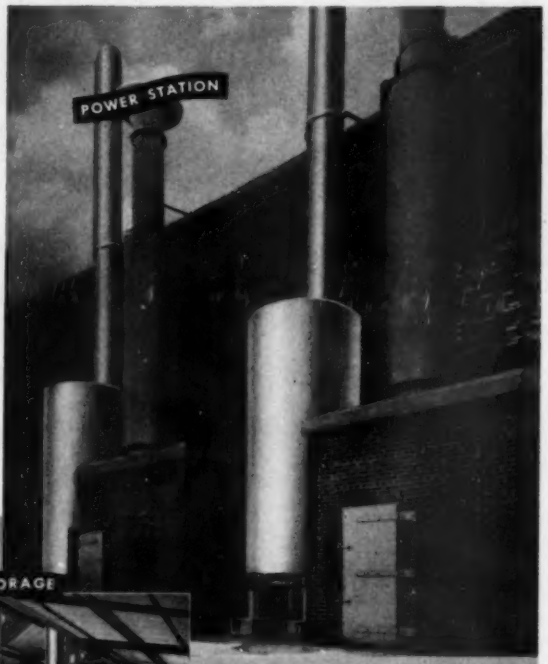
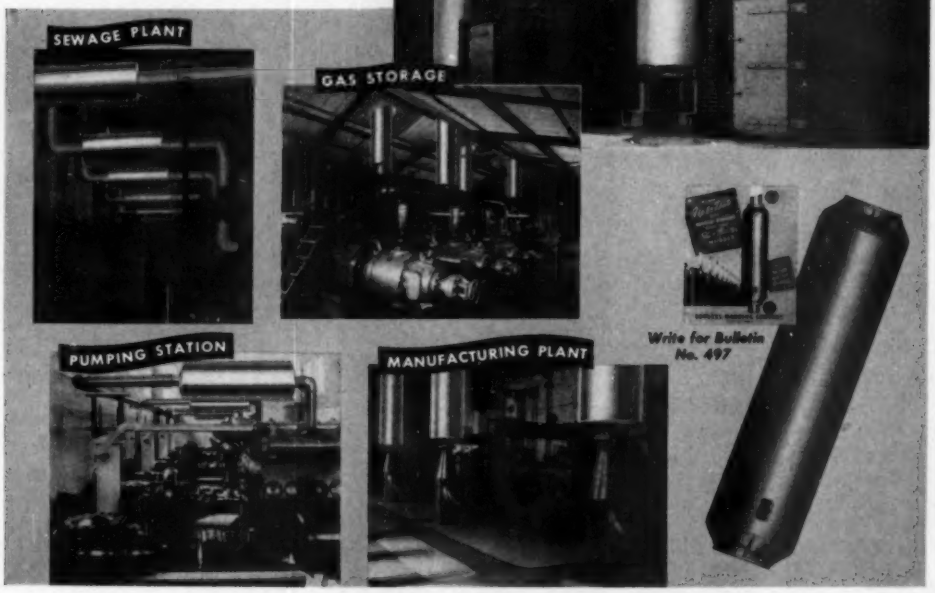




Worthington 8-cylinder 4-cycle turbo-charged Diesel engine—one of the two operated by Elko-Lamoille Power Company. This 1000 Kw-rated engine was installed on the same foundation originally built for an engine with 250-Kw rating.

Lesson in Cost Reduction

FROM THE MIDDLE OF THE DESERT

If you've never heard of Elko, you'll find this story interesting.

Elko is the seat of a county in Nevada that, all by itself, is larger than Massachusetts, Connecticut and Rhode Island together, with Delaware thrown in. Since pioneer days, it has been a transportation and trading center.

Elko's present power plant set-up, which includes two four-cycle turbo-charged Worthington Diesel engines connected to 1000-Kw generators, contrasts with the single 50-hp steam engine purchased second-hand in 1896 from a nearby silver mine.

Cost of power has never been more reasonable. Ever since 1940 when fuel oil cost this plant less than half what it does now, power rates have *gone down*—having been reduced twice during the period. Today, 87% of the power is produced by the two Worthington units, and in 1950 the plant averaged 13.3 Kw-hrs per gallon of fuel.

Lubricating oil consumption is low, too—well below the estimated 4,000 rated horsepower hours per gallon.

Want more evidence that there's *more worth in Worthington?* Write Worthington Pump and Machinery Corporation, Engine Division, Buffalo, N. Y.

WORTHINGTON

8.3.51

ECONOMICAL CONTINUOUS POWER

Diesel Engines, 150 to 2640 hp
Gas Engines, 190 to 2880 hp
Dual Fuel Engines, 345 to 2640 hp

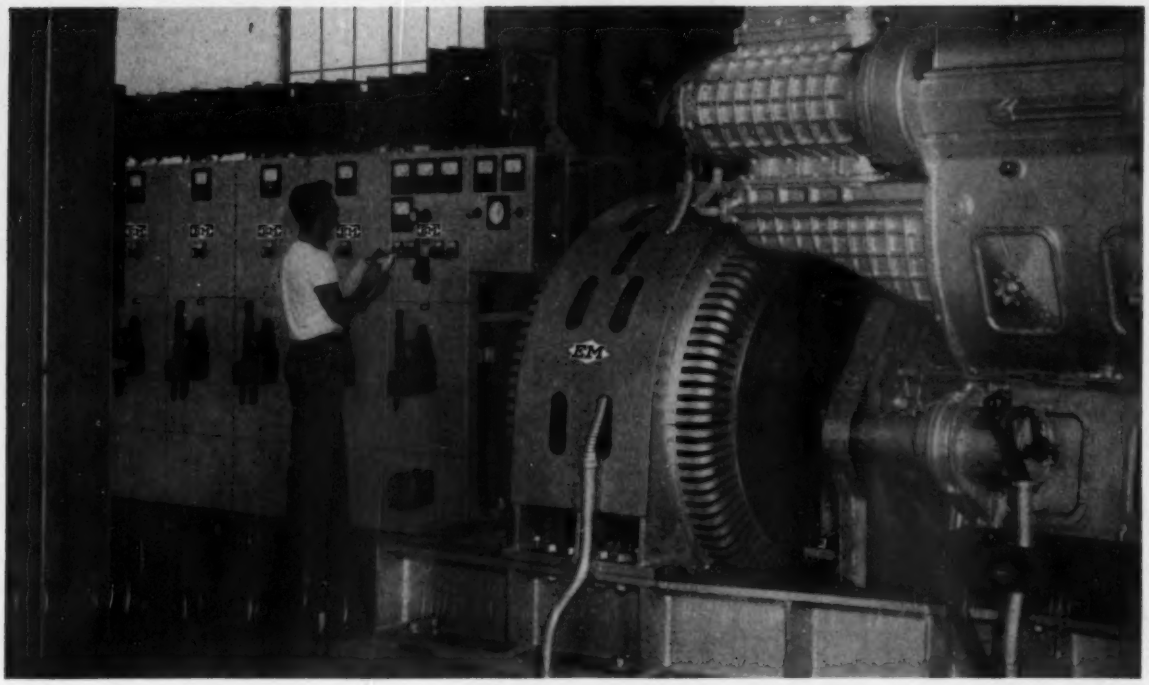
WORTHINGTON-BUILT AUXILIARIES

Balanced Angle Compressors

Oil Transfer Pumps

Cooling Water Circulating Pumps

Evaporative Type Engine Water Coolers



Matched Switchgear and Generators

SET NEW STANDARDS OF EFFICIENCY FOR MODERN POWER PLANTS

HERE is an example of matched E-M Switchgear and a 2400/4160 volt E-M Generator with a diesel engine in an upper Midwest Power Plant. The coordinated units give more satisfactory performance and smoother generation of electric power. There is greater dependability and economy.

In matched installations, factors to be considered are generator loading, power factor, motor starting, metering, voltage regulation, synchronizing and protection. These factors help efficiency and performance in your plant.

Consideration of these factors has lead to one pace-setting E-M development after another—Pre-engineered Switchgear with the advantages of custom-built gear and the economy of stock units—Generators that from their welded, rolled steel frames to their multi-layer coil insulation show the steady advance made by this company through a half century of building for year in and year out dependability.

This tremendous experience in meeting generator and switchgear requirements is available to you. E-M has field engineering and sales offices in 53 principal cities where competent advice is yours for the asking.

Talk to your nearest E-M field engineer or write to us for more details on matched generators and switchgear for your power plant.

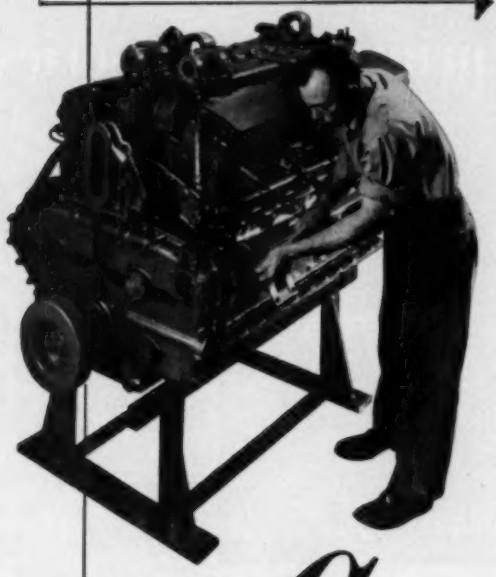
ELECTRIC MACHINERY MFG. CO.
MINNEAPOLIS, MINNESOTA

2200-TPA-2090

E-M

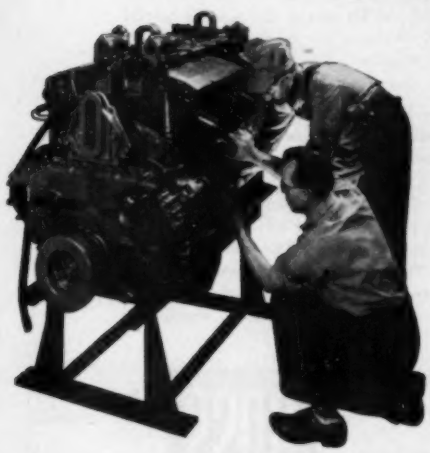
SPECIALISTS IN GENERATOR AND SWITCHGEAR ENGINEERING

BUILT NOT ONCE BUT TWICE!



Cummins is the custom-builder of the Diesel industry. Each engine is built to *fit the job*—and the individual piece of equipment in which it is to be installed. And *every* Cummins engine is built *twice*. First, each engine is assembled, run-in tested. Then it is disassembled completely, and inspected. Finally it is reassembled and tested *again*. This extra care in precision building, Cummins exclusive fuel system, efficient parts and service organization . . . mean *less* "down-time" and *more* power and profits for Cummins users. *See your Cummins dealer.*

Cummins® CUSTOM BUILT Diesels



Lightweight High-speed Diesel Engines (50-550 hp) for: on-highway trucks · off-highway trucks · buses · tractors · earthmovers · shovels · cranes · industrial locomotives · air compressors · logging yarders and loaders · drilling rigs · centrifugal pumps · generator sets and power units · work boats and pleasure craft

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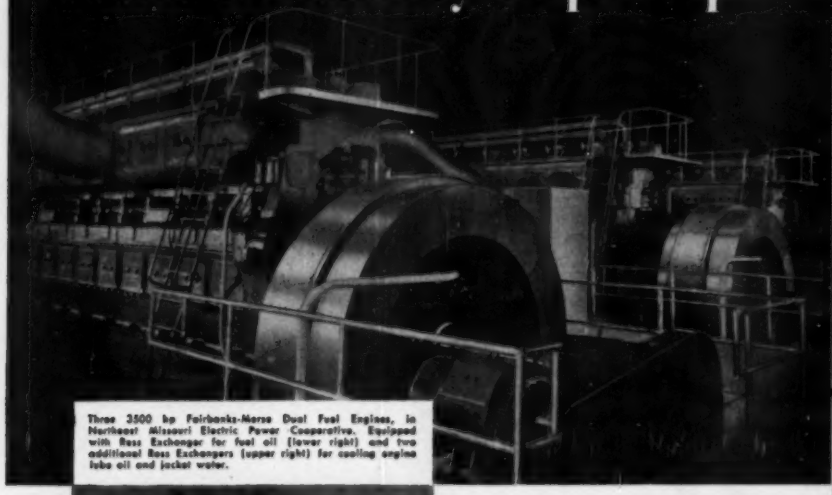
Diesel power by CUMMINS

CUMMINS Diesel

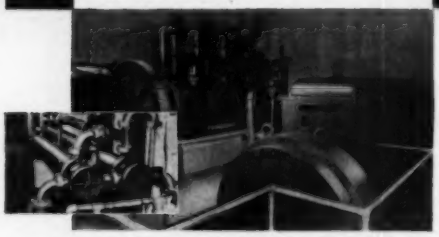
TRADEMARK REG. U. S. PAT. OFF.

Fairbanks-Morse Diesels

Count on stability of principal accessories

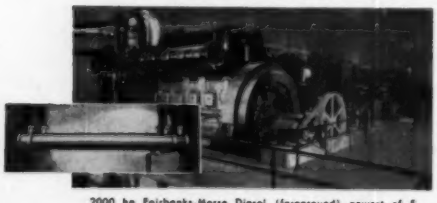


Three 3500 hp Fairbanks-Morse Dual Fuel Engines, in Northeast Missouri Electric Power Cooperative. Equipped with Ross Exchanger for fuel oil (lower right) and two additional Ross Exchangers (upper right) for cooling engine lube oil and jacket water.



480 hp Fairbanks-Morse Dual Fuel Engine in Hugo, Colorado plant of K. C. Electric Assn. Lube oil and jacket water cooling by 2 Ross Exchangers (inset).

Two 1600 hp (left) and two 2000 hp (right) Fairbanks-Morse Dual Fuel Engines supplying power for Halliburton Portland Cement Co., Corpus Christi, Texas. Equipped with Ross Exchangers (inset) for lube oil and jacket water.



2000 hp Fairbanks-Morse Diesel (foreground) newest of 5 totaling 6,725 hp in municipal power plant, La Junta, Colorado. Ross oil cooler (inset) included in engine lubricating system.

That's why *Ross* Exchangers Are Used

They can be producing the power for a portland cement plant with 1,500,000 annual barrel capacity, or for one of the world's largest rural power co-ops serving 55,000 farm homes in 27 counties. In *any* instance, Fairbanks-Morse Diesels go on indefinitely . . . dependably, profitably and with minimum maintenance.

But in order for a Company like Fairbanks-Morse to make such claims for its engines, it has to be mighty confident of its major accessories, too. And Fairbanks-Morse *is* . . . makes a selling point of them by listing the famous makes selected in its bulletins and news releases. Continually, you'll find Ross Exchangers among them — for the lube oil, the jacket water, the fuel oil — whatever heat exchange job is to be done. And the reasons? The same as those of other major Diesel builders: Ross standardization and mass production — a system that cuts engineering and fabricating time and costs; Ross heat transfer efficiency that assures long, continuous service.

For Diesel builder or user, for large or small hp ratings, Ross literature is available with helpful information — Ross engineers are available for consultation. Write.

ROSS HEATER & MFG. CO., INC.

Division of American Radiator & Standard Sanitary Corporation

1425 West Ave. Buffalo 13, N. Y.

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Standardized EXCHANGERS

Serving home and industry

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SERVING THE DIESELS THAT SERVE AMERICA . . .

DELCO-REMY

Diesels are popular in the Gulf shrimp fleet . . . and Delco-Remy electrical equipment is popular on the Diesels.

Just another example of how Diesel manufacturers and Delco-Remy work together for better engineering, better equipment and better performance.

Delco-Remy heavy-duty generator and 30- 32-volt carbon pile regulator

Delco-Remy
DIVISION OF GENERAL MOTORS CORPORATION
ANDERSON, INDIANA

DELCO-REMY—A UNITED MOTORS LINE
Service Parts and Delco Batteries
Available Everywhere Through
UNITED MOTORS DISTRIBUTORS

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DELCO-REMY • WHEREVER WHEELS TURN OR PROPELLERS SPIN

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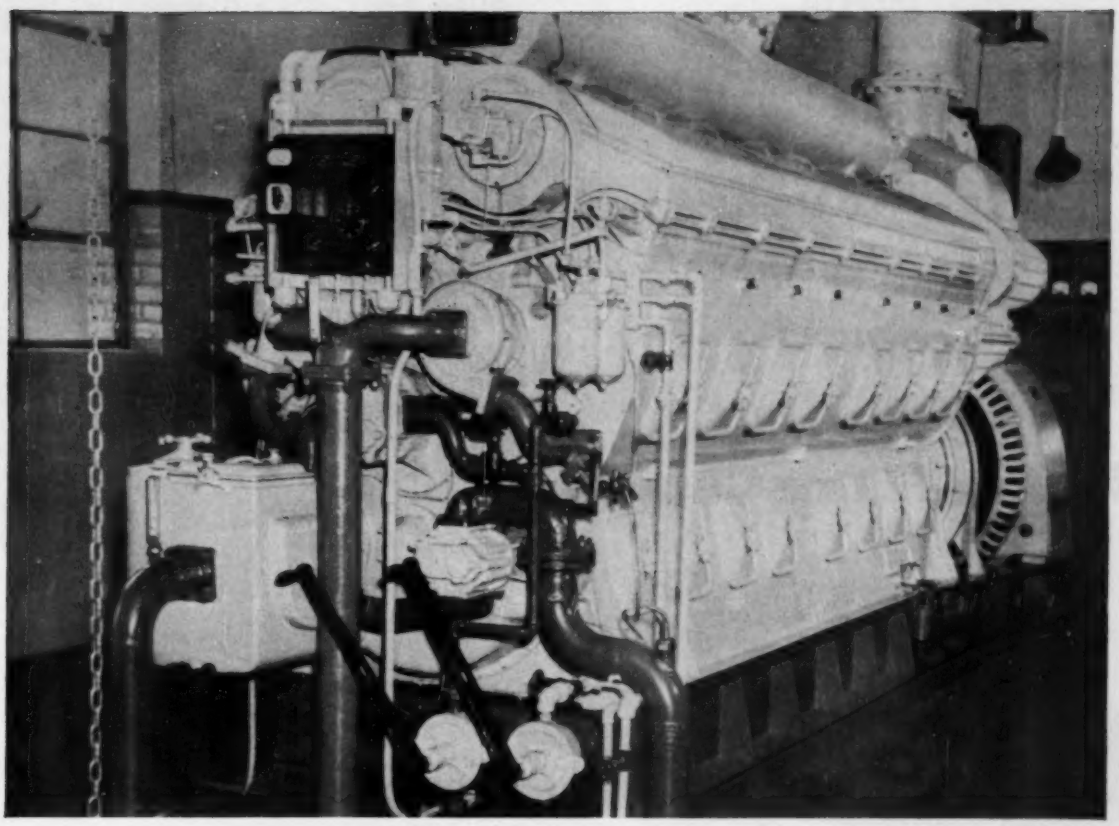
FEDERAL-MOGUL

Since 1899

Our six plants produce sleeve bearings in all designs and sizes; cast bronze bushings; rolled split-type bushings; bi-metallic rolled bushings; washers; spacer tubes; precision bronze parts and bronze bars.



Big lift for loaded diesels...

● To meet rapidly increasing power demands, a midwest power company installed four new 1440-hp diesel engines in 1948, one of which is shown above.

Steps were taken to insure uninterrupted service from these vitally needed engines. A Standard Oil lubrication specialist was consulted. Upon his recommendation, STANDARD HD Oil was given the important job of lubricating the diesels.

Despite the fact that engines have operated continuously from 6,000 to 7,000 hours with up to 110% rated load, there has been no lubrication difficulty. No maintenance, other than a valve grinding job, has been required. Engines have operated at top efficiency.

STANDARD HD Oil, a truly heavy-duty lubricant with effective detergent qualities and high oxidation resistance, will reduce maintenance and boost the reliability of your diesel engines.

STANDARD HD
TRADE MARK
OIL

A Standard Oil lubrication specialist is ready to help you gain maximum benefits from STANDARD HD. This man is located near your plant and will give you "on-the-spot" service. Arrange today for his visit by contacting the nearest Standard Oil office or by writing to:

Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

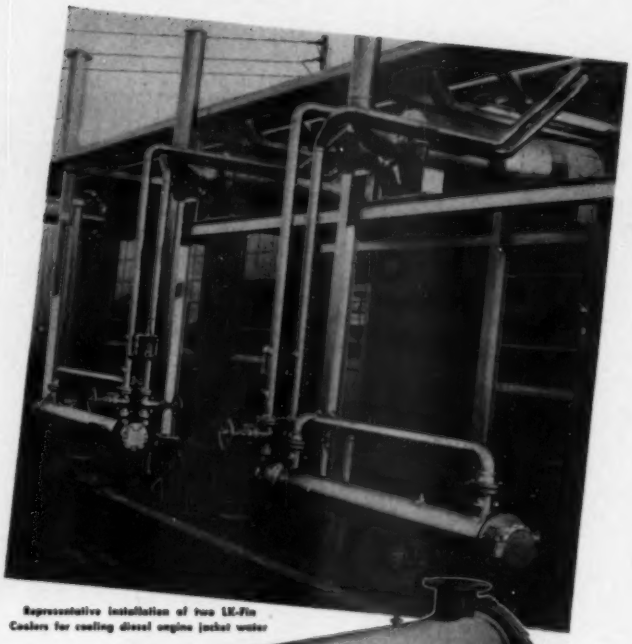
STANDARD OIL COMPANY (INDIANA) STANDARD

Why

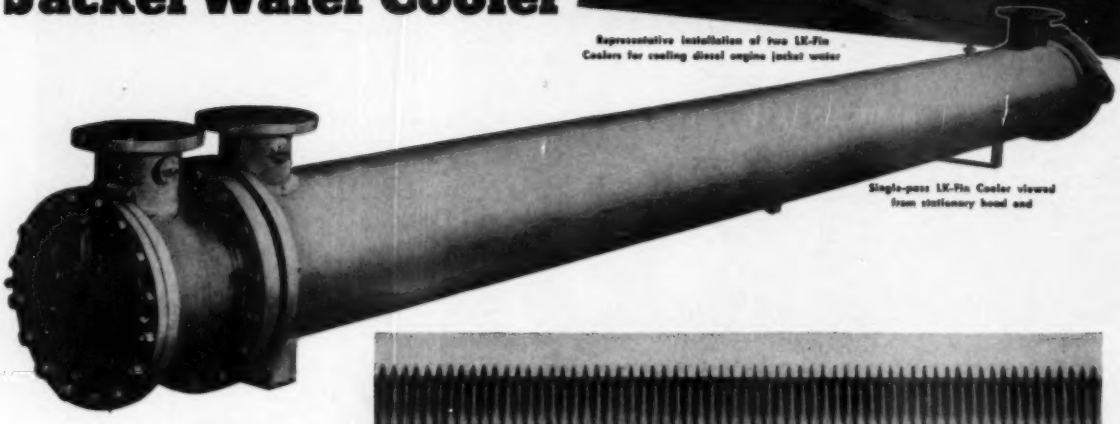
LK-FIN

means a more effective...compact and economical

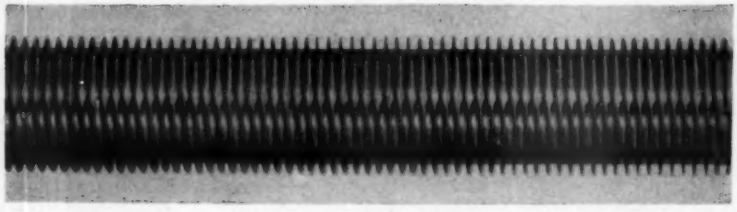
Lube Oil or Jacket Water Cooler



Representative installation of two LK-Fin Coolers for cooling diesel engine jacket water



Single-pass LK-Fin Cooler viewed from stationary head end



Portion of the helical-finned element used in the LK-Fin Cooler

It's because of the fins on the cooling elements. These fins greatly increase the external heat transfer surface . . . enable a considerably shorter tube to perform the same cooling effect that requires a much longer bare tube.

The results . . . a more compact cooler because of the more effective heat transfer surface . . . a more economical unit because of the shorter tubes and shell.

What diameter . . . thickness . . . pitch . . . should the fins be to accomplish these results? That's where G-R's unmatched know-how comes in . . . a knowledge gained from 20 years of experience in building finned-type heat exchangers and the results obtained from many tens of thousands of installed finned-tube units.

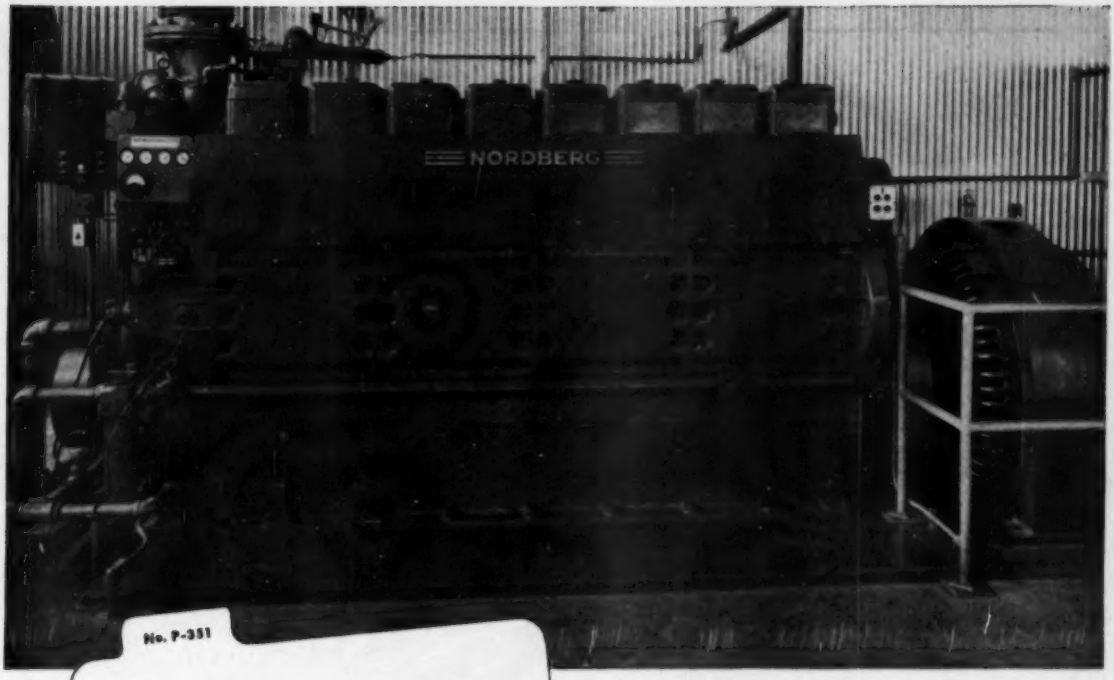
And the exclusive use of LK-Fin tubes is only one of the many distinctive features of these coolers. Write for bulletin describing them in detail, with rating tables and selection data.

THE GRISCOM-RUSSELL CO., 285 MADISON AVE., NEW YORK 17, N. Y.

GR-262 B

GRISCOM-RUSSELL

PIONEERS IN HEAT TRANSFER APPARATUS



No. P-351

THE CASE OF THE STAND-BY DIESEL that paid for itself in *FIVE MINUTES*

THIS 8-cylinder 720 hp Nordberg Supercharged and Intercooled Diesel is connected to a 500 kw AC generator for emergency power needs at the big Owens-Corning Fiberglas plant at Santa Clara, California.

With the process at this particular plant, an interruption of power for more than 5 minutes' duration could raise havoc with the processing machinery. To guard against any such shutdown caused by a failure of purchased power, the Nordberg Diesel is ready to take over the plant load at once. To make sure full power is instantly available, the engine is constantly maintained at operating temperature. Once each day the engine is started, paralleled with purchased power, and the plant load taken over for a short period... assuring its readiness, and familiarizing personnel with rapid operating procedure.

Since this installation was made, eight main power failures have occurred without warning. *In each case, the Nordberg stand-by unit was on the line and supplying emergency power within three minutes.* This service has more than saved the Diesel's original cost.

Here, then, is proved Nordberg Dependability ... *Ready for instant service!*

NORDBERG MFG. CO.
Milwaukee 7, Wis.

NORDBERG DIESELS FOR EVERY POWER REQUIREMENT.... 10 TO 9600 H.P.

For regular or emergency service, you can't beat the advantages of Nordberg Diesels . . . they can be added to the line quickly, and can be held ready for instant service without exorbitant stand-by expense . . . and in the complete line of Nordberg two and four-cycle Diesel engines, including both oil and gas burning types, you will find exactly the right unit to meet your present and future power requirements . . . in sizes up to 9600 hp.

P-351

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NORDBERG DIESEL ENGINES

CYCLAN

The best piston ring material for engines in heavy duty Diesel and Gas Fuel use.

1 CYCLAN is tough, with plenty of tension, but not brittle

2 CYCLAN has twice the breakage resistance of ordinary iron

3 CYCLAN retains tension up to 700° F.

4 CYCLAN withstands impact, hammering, flexing

5 CYCLAN withstands considerable distortion without losing shape

6 CYCLAN resists wear far better than standard ring iron

Available for rings up to 9" diameter.
Write for complete information

SEALED POWER CORPORATION
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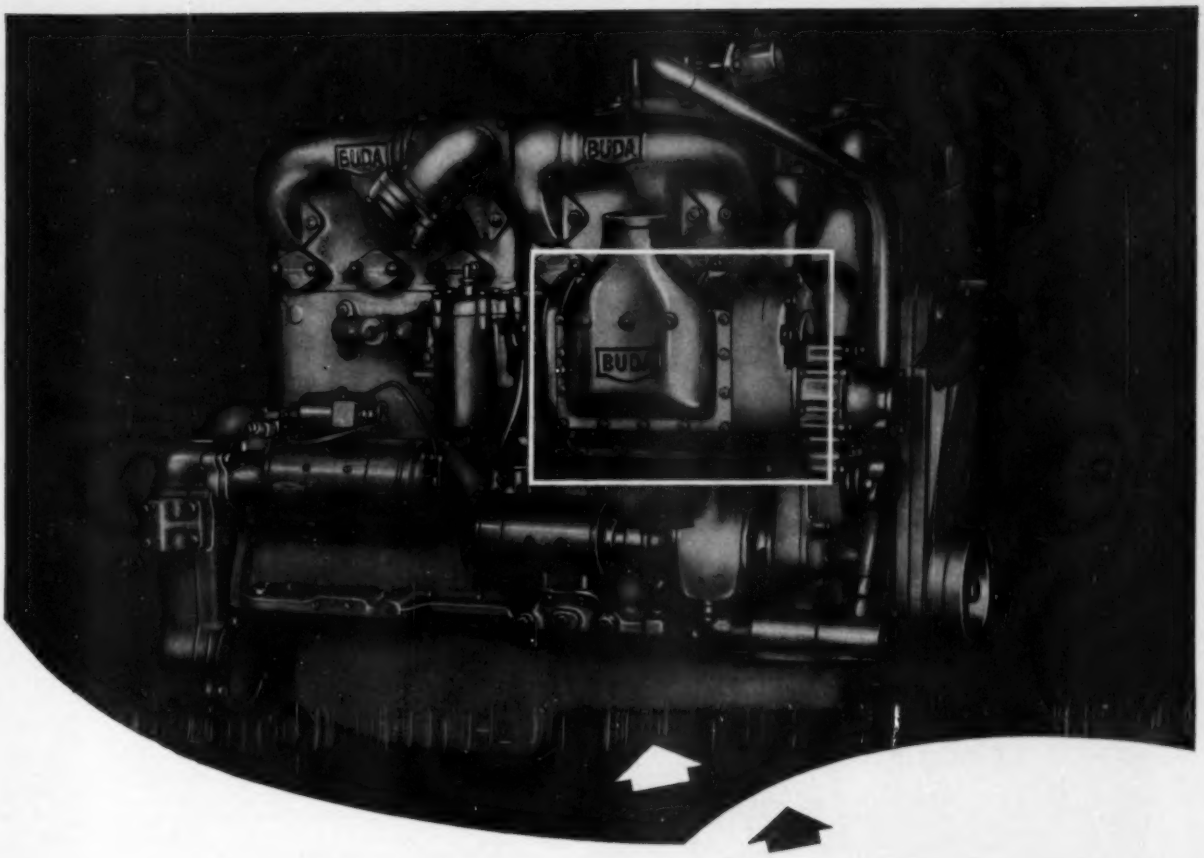
PISTON RINGS · PISTONS
CYLINDER SLEEVES



BUILT-IN POWER

BUDA Diesels use B-W Superchargers built in for added horsepower and economy

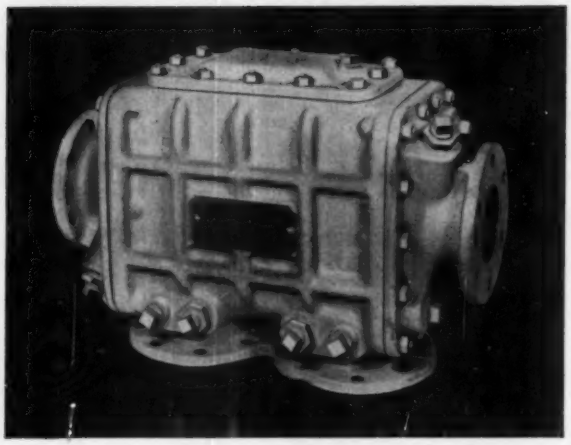
The Buda Company of Harvey, Illinois, uses B-W Superchargers on their diesels. This automotive diesel engine, Model 6-DAS-844, develops 280 brake horsepower at 2,100 r.p.m. Designed for heavy-duty truck operation both at sea level and altitude. The supercharger on this engine is one of a standard line developed by Pesco Products Division.

For motor truck, marine, railway or general industrial applications, supercharging means savings in engine space and weight . . . means power to pull heavy loads . . . means sea level operation at high altitudes. All these extra benefits without corresponding increases in operating costs.

The engine manufacturer who wants to pack more power into a given engine size . . . or who wants to add an entire new series of models to his line without retooling or the expense of redesign, can do so simply by equipping his present line with B-W Superchargers. One of our engineers will gladly explain how this can be done. There is no obligation. Write today to:

engineering Pesco Production
PRODUCTS DIVISION

BORG-WARNER CORPORATION
24700 NORTH MILES ROAD BEDFORD, OHIO



compact . . . efficient

Harrison's many years of experience in designing and building heat exchangers for Diesel marine engines has resulted in jacket-water coolers and oil coolers of unusual compactness and efficiency.

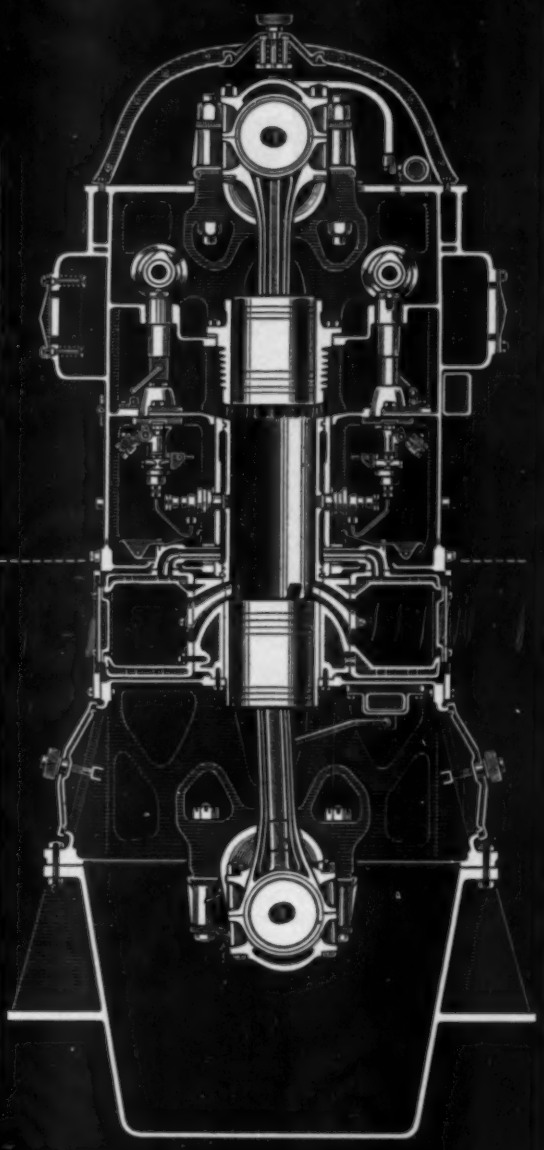
It is these outstanding advantages that have made Harrison heat exchangers first choice of leading manufacturers of Diesel equipment.

Our cordial relationship with Diesel engine builders is one of our proudest achievements . . . our engineering, manufacturing and testing facilities are available to them at all times.

HARRISON

HARRISON RADIATOR DIVISION
GENERAL MOTORS CORPORATION
LOCKPORT, NEW YORK

Cross-Section of Over 5,000,000 Horsepower...



This cross-section of an Opposed-Piston diesel engine tells why, in a few short years, over 5,000,000 hp. of engines of this design have been placed in service—for low-cost public power generation, for propelling surface and undersea craft, and as prime movers of the railroad world's newest and finest diesel locomotives.

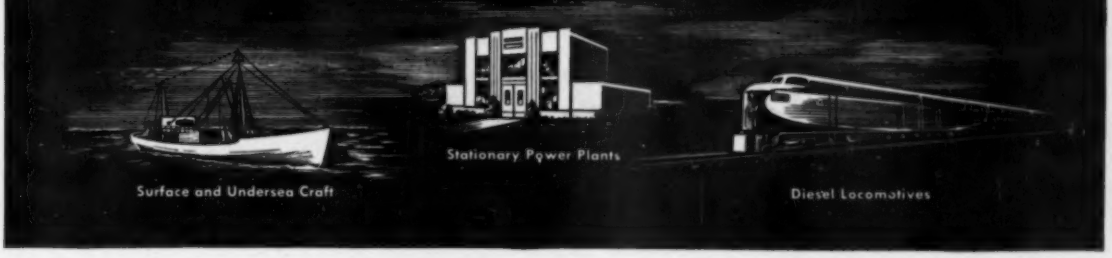
Note the design that underlies the immediate and continued success of this great engine: with TWO pistons in each cylinder—driven apart by a central combustion—the Opposed-Piston engine delivers more power per cylinder, more power per foot of floor space, more power per gallon of fuel. All this, plus the advantages of less weight, less vibration, 40% fewer moving parts. Fairbanks, Morse & Co., Chicago 5, Ill.

FAIRBANKS-MORSE,

a name worth remembering

DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • PUMPS • SCALES • HOME WATER SERVICE EQUIPMENT • RAIL CARS • FARM MACHINERY

POWERED by Fairbanks-Morse Opposed-Piston Diesel Engines—up to 2400 hp.



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LUCKENBACH STEAMSHIP CO.
NATIONAL BULK CARRIERS
ORE STEAMSHIP CO.
PENNSYLVANIA RAILROAD CO.
PHILADELPHIA TANKERS, INC.
PITTSBURGH STEAMSHIP CO.
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STANDARD OIL CO. OF N. J.
UNION OIL CO.
UNITED FRUIT CO.
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WATERMAN STEAMSHIP CO.

To the already long list of maritime operating companies that have installed De Laval Oil Purifiers in the past few years, several new names have been added.

Some De Laval machines provide two-way protection for the lubricating oil in the power unit, others are used for purification of the fuel oil — thus insuring that it delivers full heating value.

Two-way protection means (1) protection against dirt or other solid impurities in the oil and (2) protection against water. The De Laval centrifugal method insures a full supply of ***clean dry*** oil at all times.

THE DE LAVAL SEPARATOR COMPANY
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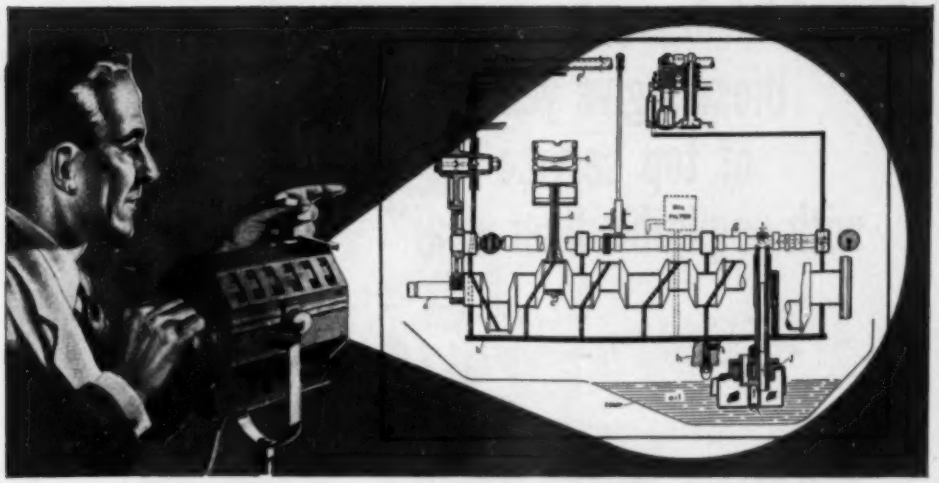

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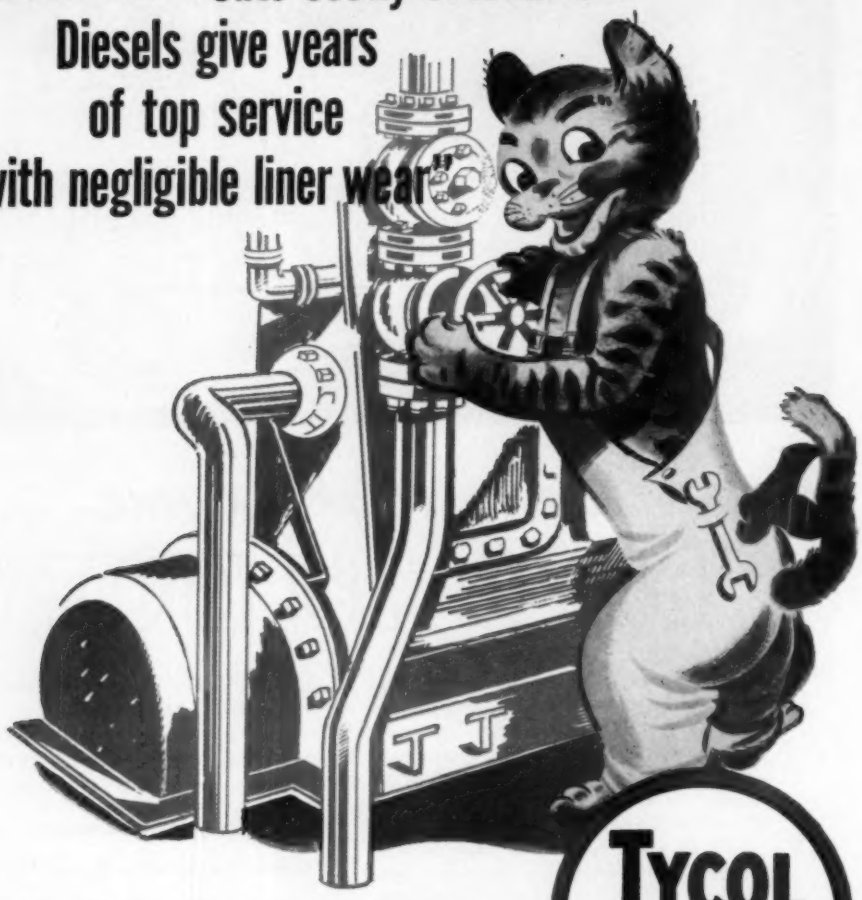

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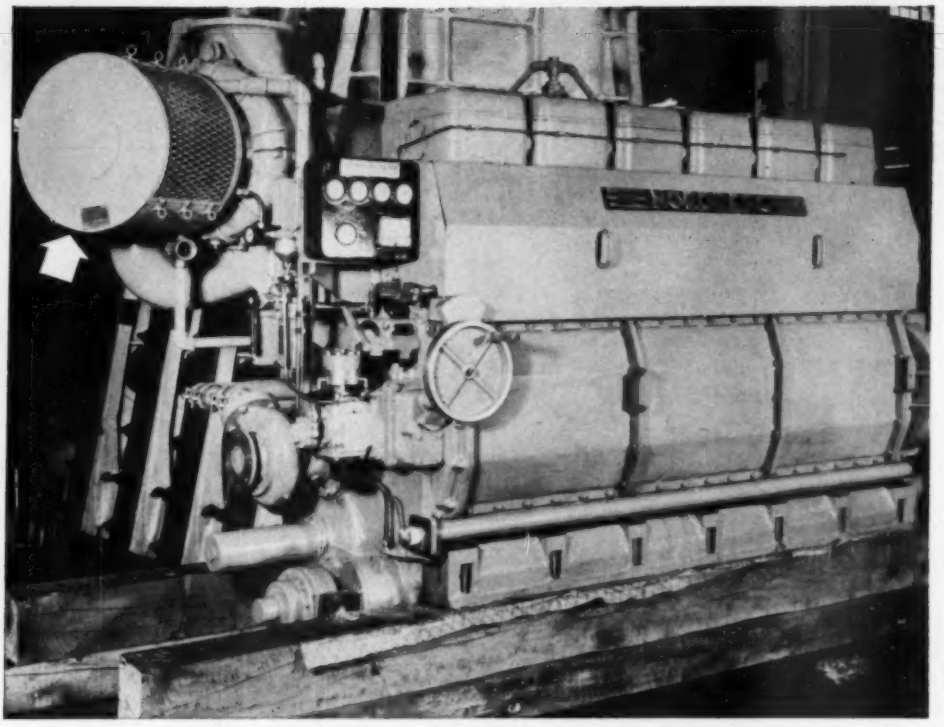

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This Nordberg six cylinder supercharged Duafuel Diesel is built for efficient power production. To assure a long, quiet life, it is equipped with an Air-Maze Type "E" filter-silencer. Mounted on the blower inlet casing flange, it overcomes annoying air noise with a specially designed acoustical chamber. A permanent, cleanable filtering element keeps dust and dirt out of the engine, greatly reduces wear and overhaul costs.

Air-Maze filter-silencers are available in a wide range of designs—including cylindrical design (above) as well as square types incorporating flat panel cells. Both curved and flat panels are of special construction to provide maximum efficiency over a wide range of air velocities. They are easily removed for servicing.

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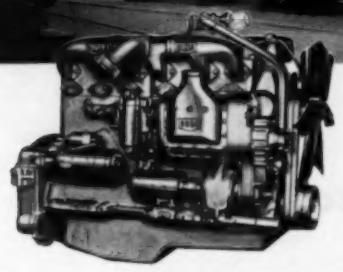

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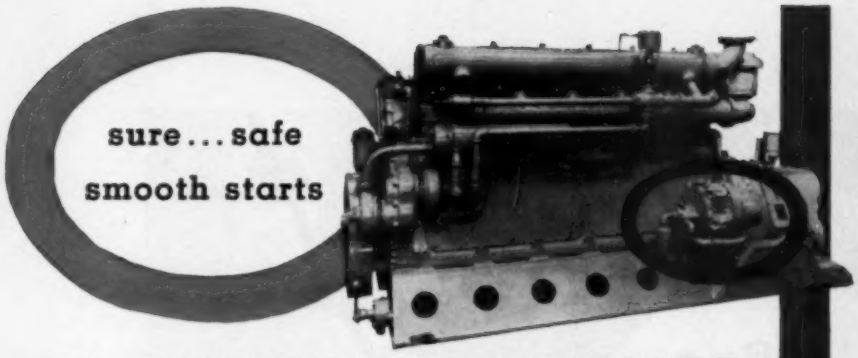

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Start your diesel engines the modern way —with Gardner-Denver Engine Starting Air Motors. These 5-cylinder radial air motors develop high torque for smooth, positive diesel starts, even under load. The automatic, air-actuated pinion engagement assures safe starts — protects gears against wear and breakage.

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- Equally effective for warm or cold weather starting.
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Are furnished to suit individual installation conditions, such as piston displacement of the engine, breakaway torque, cranking torque, atmospheric temperature, air or gas pressure available, and ring gear and S. A. E. starting motor flange specifications.

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Standard Gardner-Denver Air Motors are suitable for engine starting service with "V"-belt drive.

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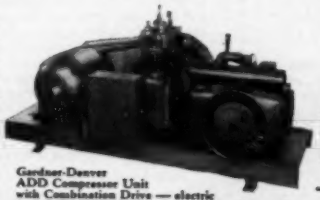
MODEL	MEGS	MMGS
H.P. Rating at 100 lbs.	6	15
Size Air Connection	¾"	1"
Air Pressure Required	25 to 200 lbs. Depending on Engine and Conditions.	
Net Weight	119 lbs.	211 lbs.

GARDNER-DENVER COMPRESSOR UNITS
for engine starting service

Gardner-Denver Vertical, Two-Stage, Air-Cooled Compressors are suitable for mounting directly on the engine, or they may be installed separately and driven by any available power.



Gardner-Denver ADD Compressor Unit with Combination Drive — electric motor for normal operation — gasoline engine for emergency starting during power failures. Ideal also for portable diesel plants often set up beyond reach of power lines.

Gardner-Denver AB Vertical Two-Stage Compressor, for higher discharge pressures. Capacities from 26.4 to 91.8 cu. ft. displacement per minute.

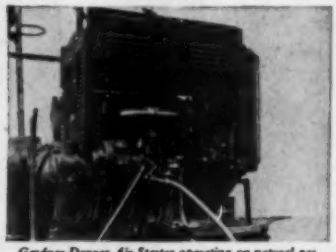
Gardner-Denver ADR & ADS Vertical "V"-Type Two-Stage, Air-Cooled Compressor. May be direct connected, or furnished with sheave for "V"-Belt drive.

AIR COMPRESSOR SPECIFICATIONS (For all pressures up to 250 lbs.)		
MODEL	BORE AND STROKE	DISPLACEMENT, CUBIC FEET PER MINUTE
ADA	3½ & 2 x 2½	8.65
ADD	4¼ & 2½ x 3½	12.1 to 24.5
ADF	4¼ & 2½ x 4	20.7 to 36.5
ADS	5½ & 3 x 4	36.9 to 47.8
ADR	6¼ & 3½ x 4	61.8

Gardner-Denver CAX Centrifugal Pump — specially designed for circulating engine cooling water. Operates with equal efficiency when rotating in either direction —simplifies mounting and piping.

Gardner-Denver Air Starter on a stationary diesel installation.

Gardner-Denver Air Starter equipped diesel engine installed in a fishing boat.



Gardner-Denver Air Starter operating on natural gas pressure available in an oil field.

Gardner-Denver Air Starter on a portable diesel rig.

Gardner-Denver Air Motor with "V"-belt drive to pinion.

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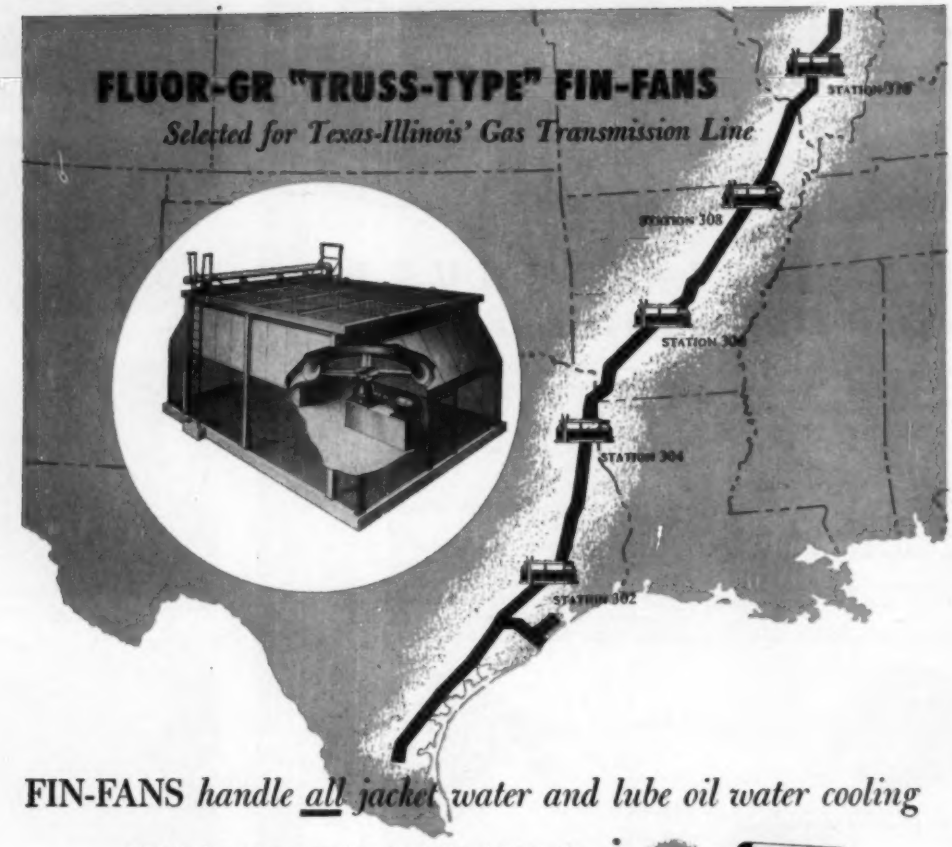

FIN-FANS *handle all jacket water and lube oil water cooling*

The initial five stations on the Texas-Illinois Natural Gas Pipeline Company's 1200-mile, 30-inch gas transmission line are equipped with Fluor's new "Truss-Type" Air-Cooled Heat Exchangers. In addition to economy and dependability of operation, these new "Truss-Type" Fin-Fans are designed for low-cost extension by utilizing end columns of existing units as an integral part of future extensions. When greater cooling capacity is desired, it is only necessary to add to the existing installation—time and space requirements are minimized and the extension can be made without disturbing plant operation.

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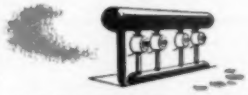

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To reduce gas stream pulsations and attendant vibration, Fluor Pulsation Dampeners are installed for both suction and discharge service in four of the five Texas-Illinois Natural Gas Pipeline Company's compressor stations.

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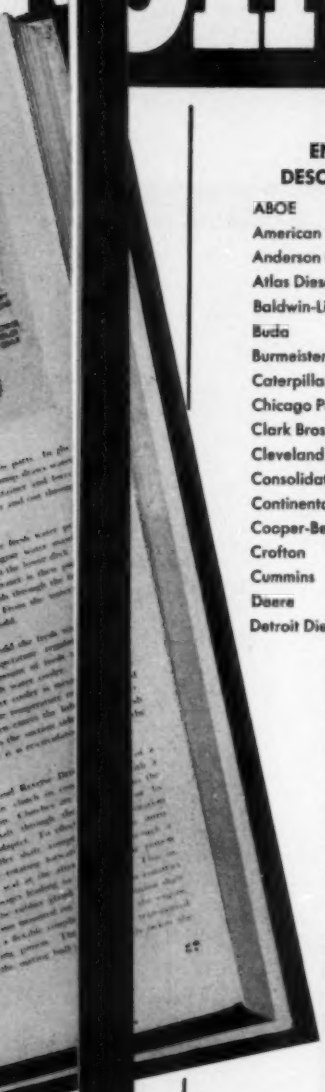

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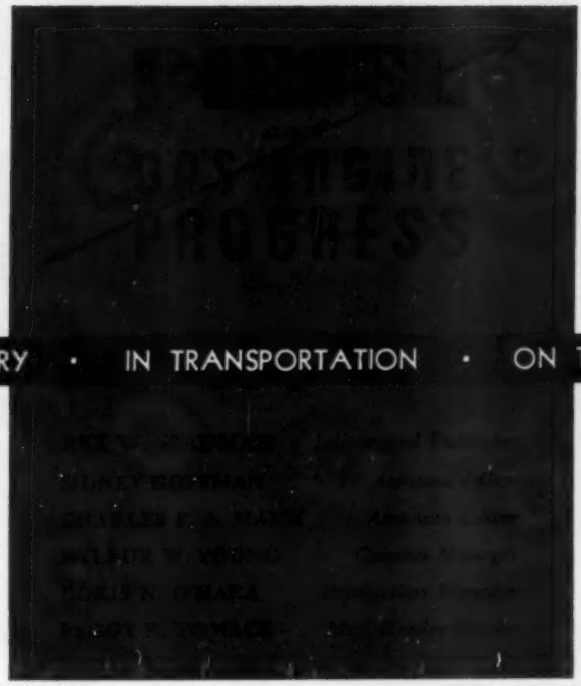

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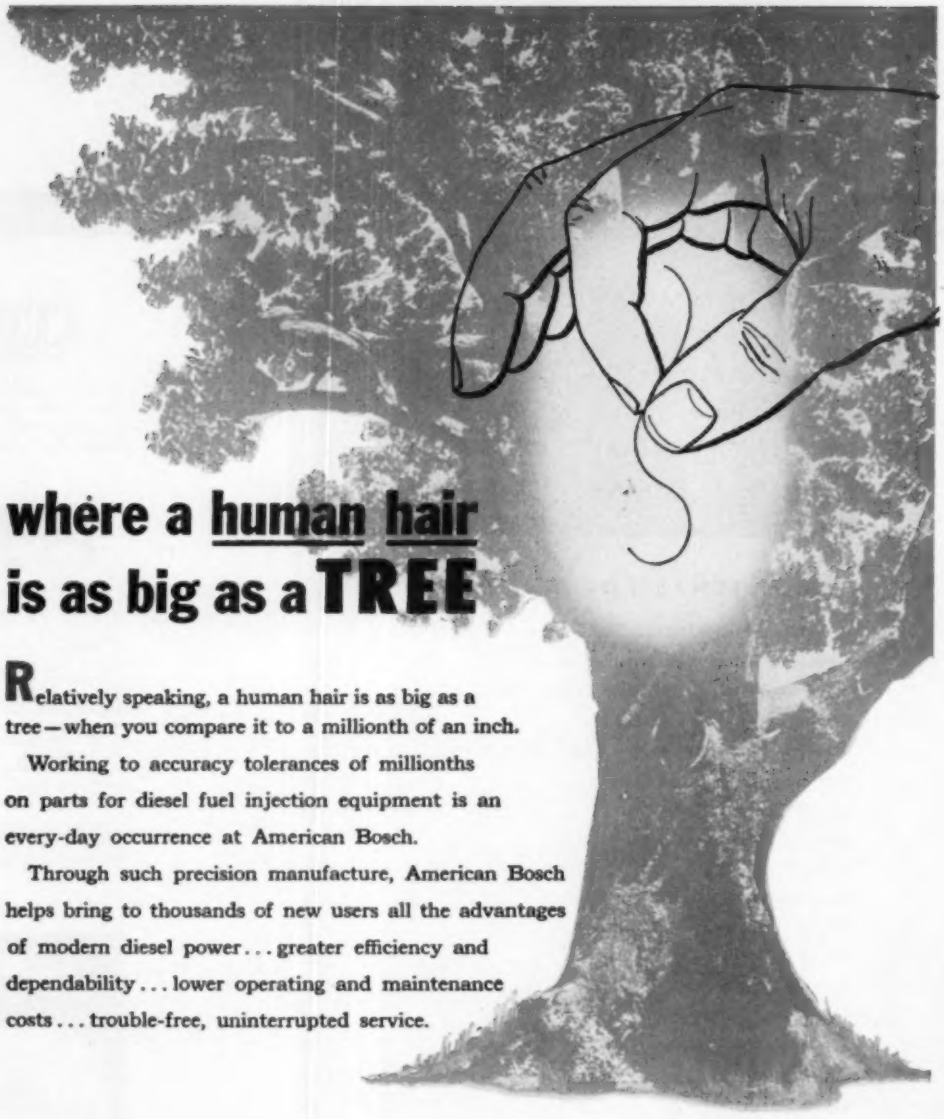

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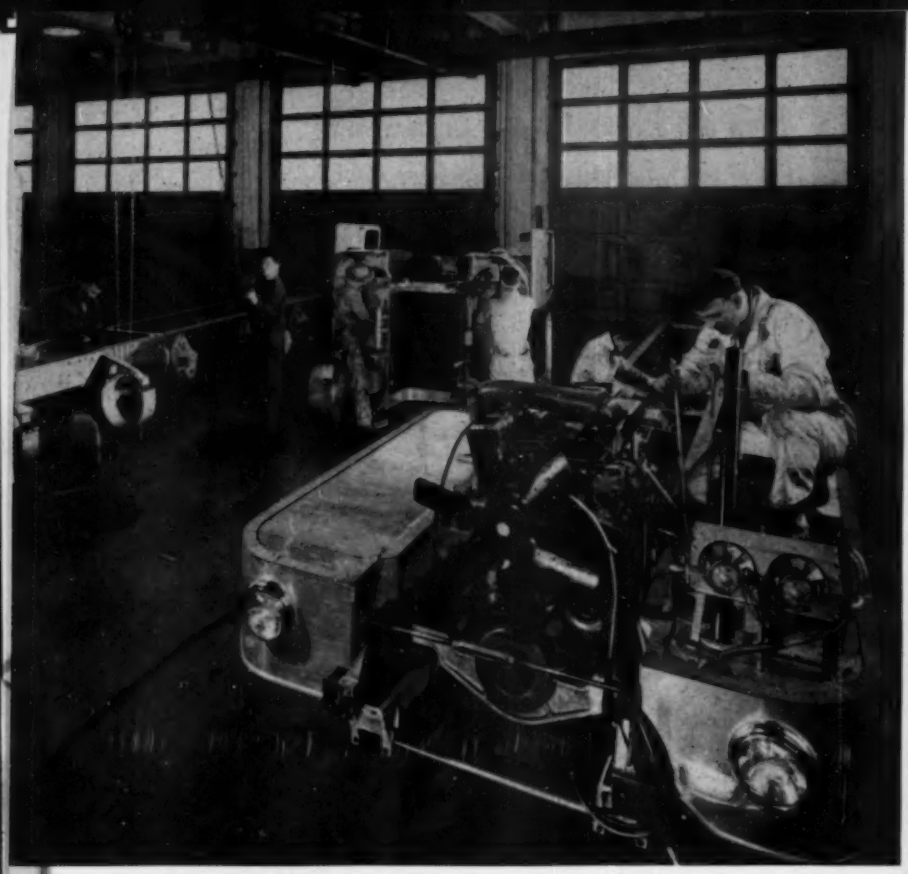
More Power, Lighter Weight, Bigger Capacity Within Smaller Dimension Limits — That's The White-Freightliner Heavy Duty Highway Truck

By CHARLES F. A. MANN

WAY out in a location that was once a prominent West-Side Portland, Oregon, residential district, is a sprawling pair of enterprises that actually are bringing about a revolution in highway transportation in all parts of the Continent. We refer to Consolidated Freightways, the sprawling 11,000 mile highway transport operator now ranking as the largest in the West and close to being the largest in the entire USA, and its affiliate, Freightliner Corp., that builds mainline highway trucks and nothing else. One is the proving ground for the other, and each has evolved to its present size and position in the industry as a direct result of each other's constant search for the ideal truck and tractor combination to haul freight on rubber tired wheels.

Freightliner Corporation began essentially as a body shop for Consolidated. Every mile of practical operation determined the evolving series of changes in design and fabrication in the newer truck and tractor models. Today, therefore, Freightliner Corporation, with a nation-wide background of hauling all types of freight, over every type of road, in all kinds of weather and through

Cab-Over-Engine light weight dual-drive White-Freightliner tractor with deluxe sleeper. Standard equipment: Buda diesel 6DA844 or Cummins diesel NHB600.



Finishing touches are being put on cab (on end in background) prior to installation on truck chassis in right foreground. All engine "plumbing" operations are performed prior to installation of cab. Engine shown is a Cummins diesel engine.

every topographic feature in the nation, not to mention legal restrictions on speeds, loads and sizes, now produces on a mass-production scale a line of three basic units that will do just about everything in the nation's highway transport picture.

By arrangement with White Motors, the White-Freightliner Trucks are now going out in quantity to truckers everywhere, in three basic models, with optional installation of Buda or Cummins diesels. As nearly as possible, construction features on the chassis and accessories of all three models follow the same basic design, to increase performance and reduce manufacturing costs.

The three basic White-Freightliner models are the WF-65 dual drive truck, which is capable of carrying a 22′ van body and pulling a 28′ trailer for a total loading space of 50′ within the overall 60′ legal length limitation in effect in most western states. This model chassis is a widely used model for the petroleum and other liquid transport users. The truck with tank and a two axle frameless trailer within an overall length of 60′ will haul over 8000 gallons within the legal weight limitation in the western states.

Second and most important of the line is the WF-64T "Trancontinental" tractor, designed strictly to haul a semi-trailer and keep within the overall 45′ length to comply with requirements in states having this length limitation. The "Transcontinental" tractor features a deluxe enclosed sleeper compartment inside the cab for a relief driver.

Third in the line is the WF 42 "Californian" tractor which is a very short wheel base single drive model to pull two 24′ trailers within the 60′ legal length limitation.

Based on millions of miles of practical use over the entire USA, the present Freightliner line, which will be marketed by the White Truck organization, features every safe, but practical weight reduction and space limiting feature that seems possible to work into a truck design. On the basic steel chassis, almost all of the castings and brackets for supporting accessories are lightweight aluminum or magnesium, including axle and differential housings, cab parts, radiators, grillwork, exhaust and tank systems, etc. Payload increases due to weight reduction alone on the WF 64 tractor and truck models give almost a uniform increase of 3000 lb. of payload, or enough to pay for the higher cost of more expensive alloy metals in a matter of weeks!

All the line features cab-over-engine design which permits a total loading-length of 50′ in the 60′ legal length limits! Wheels and necessary steel parts are lightweight high alloy; the cab is entirely of aluminum and springing systems are designed to cushion the load and make it easier on the drivers, not to mention increased life of the vehicle. Buda or Cummins diesels in a wide choice of horsepower ratings are optional, with two regular Buda models and seven Cummins models. On the tractor model, designed for heavy pulls as well as heavy loads with a large semi-trailer, larger fuel capacity and bigger diesels are necessarily featured.

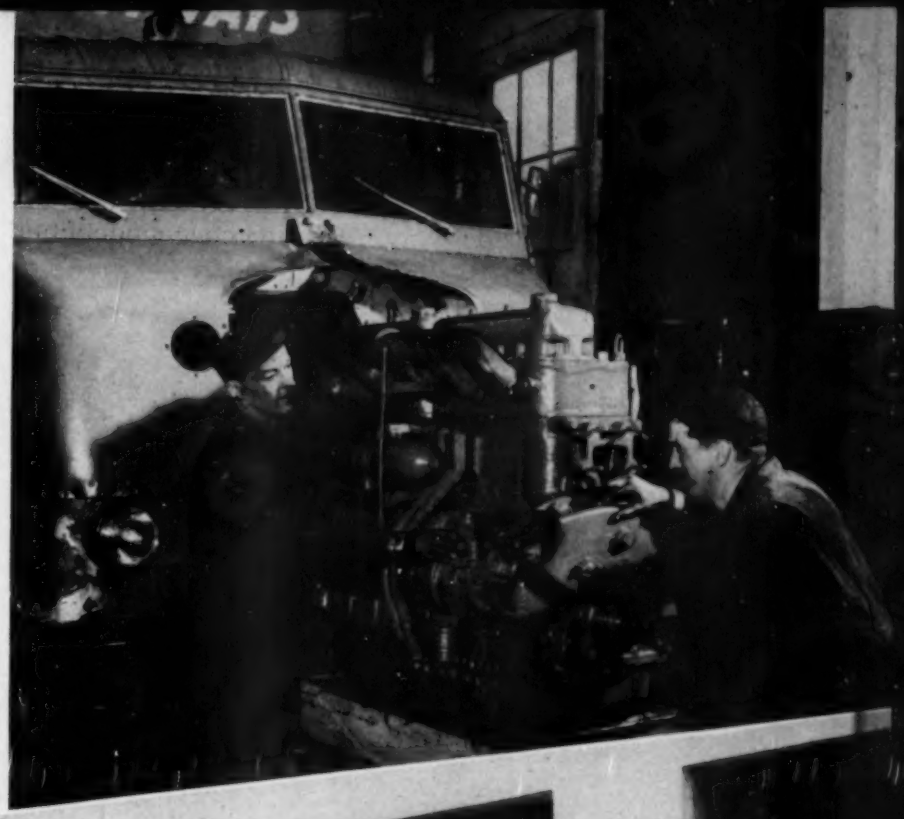
When full bodies are supplied on the truck models, Freightliner can build a unique lightweight standardized model out of structural plywood, aluminum sheeting, wood and steel grating and flooring that

White-Freightliner trucks are started upside down to facilitate assembly of frame and brackets. (Note the aluminum-alloy spring hanger-brackets and fuel tank brackets on the frame in the foreground.) The frame is then turned over and engine, transmission, axles and cab are then installed. A Buda diesel with Fuller transmission is being lowered into position.

Top right: Engineered accessibility of parts makes it easy to service and repair White-Freightliner trucks. Shown above are 2 mechanics installing a Hercules diesel engine, complete with transmission in a 1948 model Freightliner without removing the cab. Cummins and Buda engines with transmissions attached are removed and installed in the same manner, using this specially designed dolly that makes it possible to roll engine complete with transmission in or out of the truck.

Another view of the White-Freightliner Cab-Over-Engine diesel truck—overall length 29 ft., available body space 22 ft.

will carry a boxcar load of freight in the truck and trailer bodies, which are matched, at the lowest body weight of any U. S. builder. Weight reduction is the biggest profit builder in truck operators when all factors outside the diesel plant and running gear are considered. By adhering strictly to over-the-road trucks and tractors of highly specialized design, eliminating all compromises between city and local truck models of innumerable special types, Freightliner becomes one of the nation's No. 1 truck builders—the Pullman or American Car & Foundry of the Highways!



GOODLAND, KANSAS

Kansas Municipal Plant Installs 2,000 Hp. Fairbanks-Morse Dual-Fuel Engine; Boosts Profits More Than $2,000.00 a Month

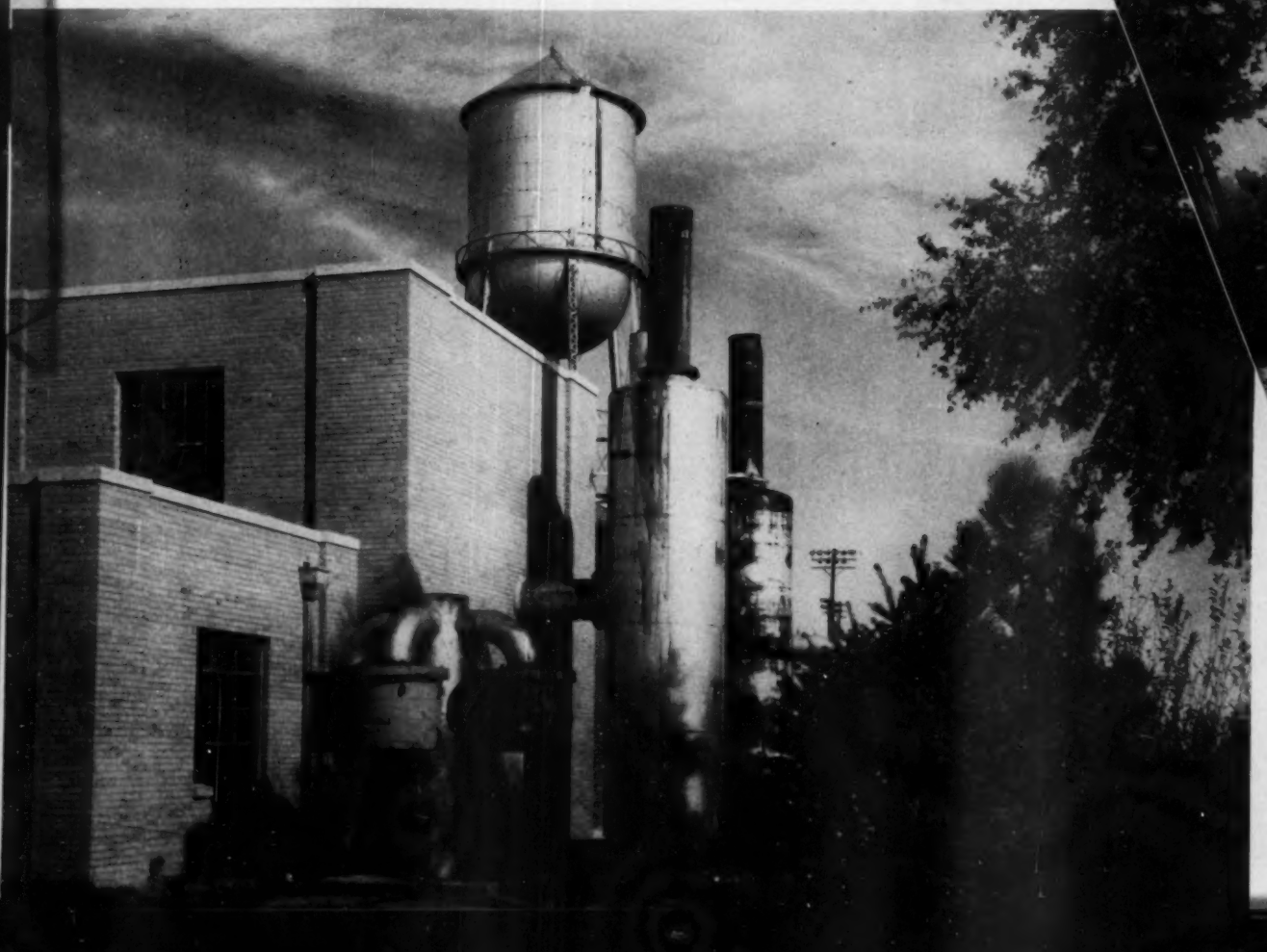
By W. H. GOTTLIEB

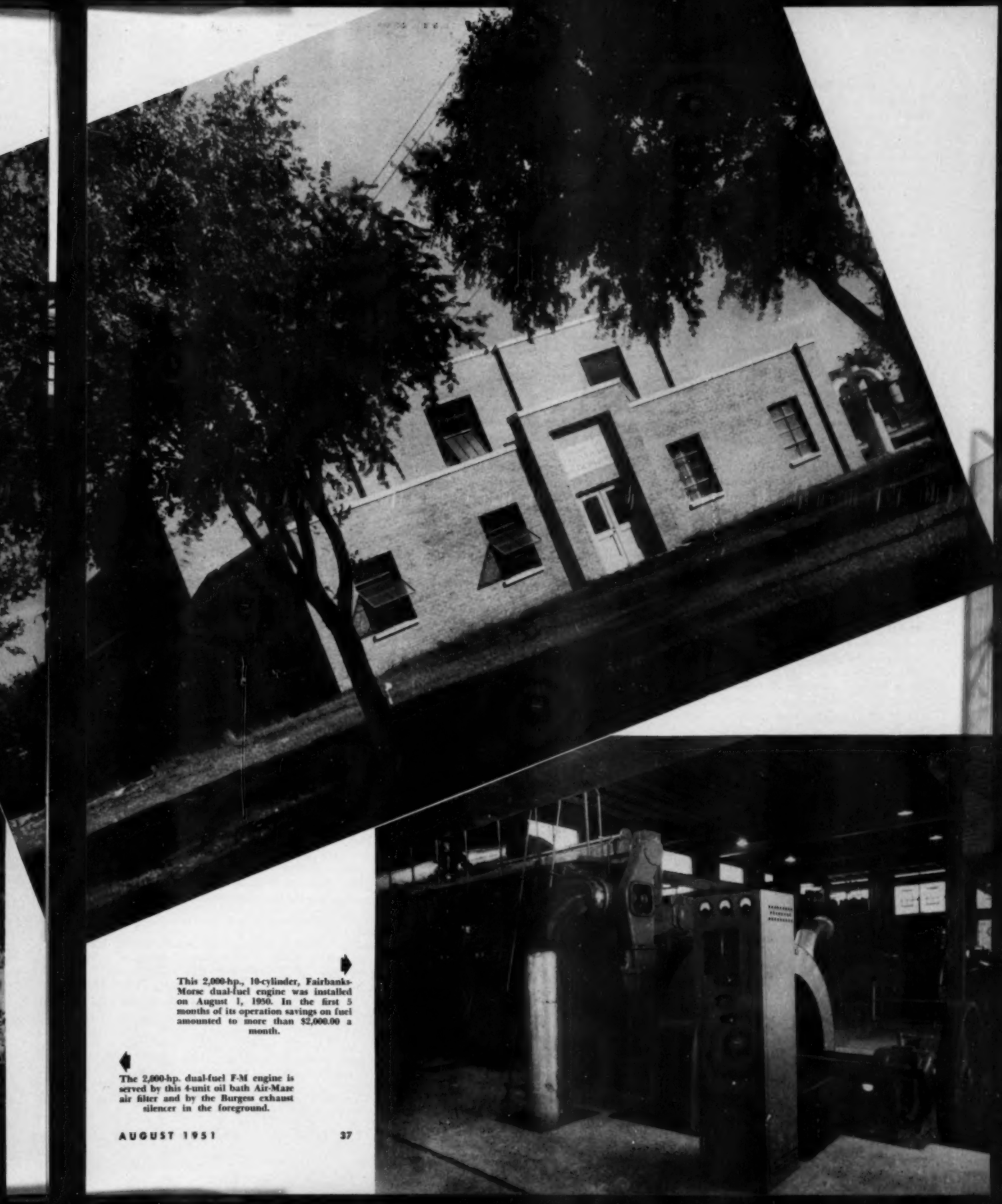
A new 2,000-hp. Fairbanks-Morse dual-fuel engine has carried the profitable Goodland, Kansas, municipal power plant into a new era of operating economy. In the engine's first five months of service, savings on fuel have amounted to more than $2,000.00 a month. This year, it is planned to convert a 1,600-hp. diesel to dual-fuel operation in order to achieve further reduction in the fuel bill. Goodland and its power system have been growing rapidly in size and prosperity in the past decade. Population rose from 3,300 in 1940 to more than 5,000 in 1950 and the growth is continuing at an accelerated pace. Activity is high in both residential and commercial building. Necessarily, community services must keep pace. The past year saw completion of a $125,000.00 city building and a new ultra-modern school.

No modern city can develop without concomitant development of its power facilities. Goodland purchased its electric distribution system from a private utility company in 1937 and built a power plant with three Fairbanks-Morse diesels: a 700 hp., 16-in. x 20-in.; a 500 hp., 12-in. x 15-in.; and an old 180 hp., 14-in. x 17-in. unit that had been in service in the city's water plant. Initial rates announced by the city were a full 20 percent lower than the utility charges. In 1939, the 180-hp. engine was sold to Herndon, (where it is still in operation) and Goodland put in its place a 1,225-hp. Fairbanks-Morse diesel, a 7-cylinder, two-cycle, pump-scavenging unit, driving directly a Fairbanks-Morse alternator. In 1940, the three-engine plant generated a total of 2,841,900 kw. hr. Load grew as the city grew but normal growth was inhibited by the war and the unavailability of additional engines. In 1947, the city installed a 1,600-hp., 8-cylinder, F-M diesel driving an F-M alternator. This permitted a strong spurt in power production which reached 7,351,000 kw. hr. in 1948.

The peak was still not in sight. The rich wheat lands of the region engendered a rising prosperity with more homes and more stores for Goodland.

The power plant building at Goodland, Kansas, was extended when the new 2,000-hp. Fairbanks-Morse dual-fuel engine was installed to make room for the engine and to provide room at the front for the Superintendent's office and for the switchboard.





This 2,000-hp., 10-cylinder, Fairbanks-Morse dual-fuel engine was installed on August 1, 1950. In the first 5 months of its operation savings on fuel amounted to more than $2,000.00 a month.

The 2,000-hp. dual-fuel F-M engine is served by this 4-unit oil bath Air-Maze air filter and by the Burgess exhaust silencer in the foreground.

and more electric appliances in the average home. On August 1, 1950, the city put into service its biggest engine, a 2,000-hp., 10-cylinder, Fairbanks-Morse dual-fuel engine, driving a 1,400 kw., F-M alternator. Total production for 1950 was a record 8,480,100 kw. hr., nearly three times the 1940 generation. The plant has been consistently profitable throughout its life. In the last decade, net profits after depreciation ranged from a low of $29,450.62 in 1941 to a high of $51,317.35 in 1946. Although the price of fuel rose from $.045 a gallon in 1938 to $.105 in 1950, mass production economies were a compensating factor and consumer rates were never raised. Though profits declined somewhat from the 1946 peak, the total for the past five years topped $200,000.00

To meet the rising cost of fuel, Goodland turned to natural gas as a source of power. The 2,000-hp. engine is designed to operate on gas with a small quantity of oil as a pilot fuel. Put on the line August 1, 1950, the unit ran a full five months by the end of the year. In this period, the engine generated 2,209,600 kw. hr. while consuming 28,043,000 cu. ft. of gas and 17,323 gal. of pilot oil, an average of 12.69 cu. ft. of 975 btu. gas and .0078 gal. of 133,000 btu. oil per kw. hr. This, of course, was a period of break-in and adjustment and it is significant that the last month reported showed the best fuel efficiency. Table I gives detailed monthly operating figures for the five-month period. Natural gas at an average price of $.223 per MCF is far more economical than oil at $.105 and the new engine has effected substantial reductions in generating costs. At the fuel prices prevailing in each month reported, the dual-fuel unit's production of 2,209,600 kw. hr. would have entailed the expenditure of $18,904.47 for fuel if generated by the oil burning diesels. In fact, the actual fuel expenditures were just $6,251.86 for gas and $1,796.18 for pilot oil, a total of $8,048.04. This represents a five-month saving of $10,856.43. Fuel costs averaged $.00364 per kw. hr. for the full period and were down to $.00326 in December. Detailed cost figures for the big engine are listed in Table II.

At present production rates, the dual-fuel engine will save Goodland more than $25,000.00 a year. Because of its superior economy, it was run 2,236 hours in the five months and produced 63 percent of the plant's total production. Obviously, though, the one big engine cannot do the job alone. Peak loads necessitate the operation of additional units and valley loads are too low for efficient performance. Consequently, Goodland promptly laid plans for conversion of the 1,600-hp. engine. In designing the dual-fuel engine, Fairbanks-Morse engineers devised a system which could be applied effectively and conveniently to engines in the field.

Thus, with conversion parts, the old engine will be virtually identical to a new dual-fuel and will have full operating efficiency. The natural gas comes from a Kansas field through the lines of the Kansas-Nebraska Pipe Line Co., and reaches the plant at 36-lb pressure. It passes through the gas company meter, then through a regulator and then flows at 20 lb. to the engine gas header through an admission valve controlled by the engine governor. Gas enters the cylinders through cam-actuated valves. Valve lift is constant; quantity of gas admitted is regulated by pressure in the header.

A distillate oil of 32-36 gravity is used as fuel for the full diesels and as pilot fuel for the gas-burning engine. The plant has six storage tanks totaling 92,000 gal. From storage the oil is delivered by a motor-driven transfer pump through filters and meters to individual concrete basins underground outside the plant. The engine supply pumps pick up the oil which is filtered again before reaching the injection system. In the case of the dual-fuel engine, a constant charge of pilot oil is delivered to the cylinders by individual small-volume injection pumps which meter the fuel accurately. When operating as a dual-fuel, the big engine switches instantly and automatically to full diesel if the gas supply fails and returns to gas when the fuel is again available.

Principal Equipment on New 2,000-hp. Engine

Engines: One 2,000-hp., 10-cylinder, 16 x 20-in., 300 rpm., Model 38FD16, Dual-fuel engine. Fairbanks, Morse & Co.; One 1,600-hp., 8-cylinder, Model 38F16 engine. Fairbanks, Morse; One 1,225-hp., 7-cylinder, 16 x 20-in., two-cycle, pump-scavenging, Model 38D16. Fairbanks, Morse; One 700-hp., 16 x 20-in., Model 38D16 engine. Fairbanks, Morse; One 500-hp., 12 x 15-in., Model 38D12 engine. Fairbanks, Morse.
Alternators: Fairbanks, Morse.
Pilot Oil: Shell 32-36 distillate.
Natural Gas: Kansas-Nebraska Pipe Line Co.
Transfer Pump: George D. Roper Corp.
Fuel Filters: Wm. W. Nugent & Co.
Fuel Meters: Pittsburgh Equitable Meter Div.
Gas Regulator: Fisher Regulator Company.
Lube Oil: Standard HD. Standard Oil Co. (Ind.).
Lube Filter: Midwest Filter.
Oil Cooler: Ross Heater.
Cooling Tower: Diesel Service Co.
Jacket Water Pumps: Three 1,000 gpm. vertical Pomona turbine pumps driven by 15-hp. motors. Fairbanks, Morse.
Raw Water Pumps: Two 1,000 gpm. vertical Pomona turbine pumps driven by 15-hp motors. Fairbanks, Morse.
Air Filters: One 4-unit oil bath filter. Air-Maze.
Blower: Roots-Connersville.
Exhaust Snubber: Burgess-Manning.
Battery Set: 48-volt battery set. Exide.
Air Compressors: Fairbanks, Morse and Gardner-Denver.
Alarm Panel: Fairbanks, Morse.
Pyrometer: Brown Instrument Co.
Gauges: Ashcroft.

GOODLAND, KANSAS — TABLE TWO

1950	Kw. Hrs. Gen.	Cost of Gas, $	Cost of Pilot Oil, $	Total Fuel Cost, $	Fuel Cost per Kwh.	Dual Fuel Savings
Aug.	417,700	1,222.58	345.75	1,568.33	.00375	1,842.85
Sept.	482,200	1,403.73	417.38	1,821.16	.00377	2,297.59
Oct.	406,900	1,209.34	363.67	1,573.01	.00386	1,902.33
Nov.	426,600	1,169.39	360.15	1,529.54	.00358	2,202.96
Dec.	476,200	1,246.82	309.23	1,556.05	.00326	2,610.70
TOTAL	2,209,600	6,251.86	1,796.18	8,048.04	.00364	10,856.43

GOODLAND, KANSAS — TABLE ONE

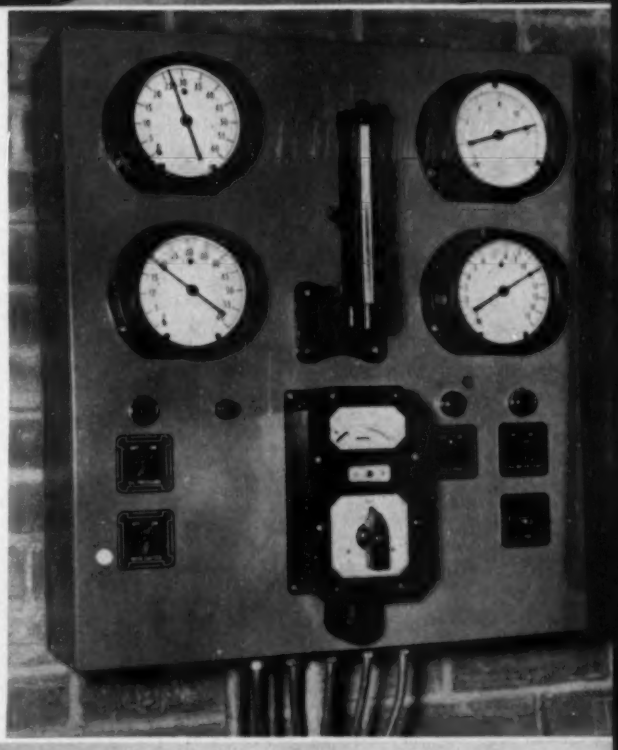
	Total Plant		2000-Hp. Engine								
1950	Kw. Hrs. Gen.	Gal. Fuel Consumed	Kw. Hrs. Gen.	MCF Gas Consumed	Cu. Ft. Gas Per Kw. Hr.	Pilot Oil Gal.	Engine Hours	Aver. Load kw.	Load Factor %	% Total Gener.	Lube Oil Gal.	Hp. Hr. Per Gal. Lube
Aug.	708,600	29,607	417,700	5,315	12.72	3,528	444	941	77	59	120	7,400
Sept.	672,900	21,034	482,200	6,103	12.65	4,072	478	1,007	83	72	198	6,836
Oct.	694,300	26,918	406,900	5,258	12.92	3,348	394	1,032	85	59	170	4,635
Nov.	689,000	24,838	426,600	5,492	12.87	3,430	438	974	80	62	170	5,153
Dec.	740,600	24,253	476,200	5,875	12.33	2,945	482	988	81	64	200	4,820
TOTAL	3,505,400	126,650	2,209,600	28,043	12.69	17,323	2,236	988	81	63	858	5,212

Scavenging air for the 2,000-hp. two-cycle engine is drawn through a four-element oil-bath filter and is delivered to the engine by a big motor-driven blower. Air intake is controlled by a governor-regulated admission valve which provides the proper gas-air ratio and insures adequate air for full combustion under all load conditions. The blower motor is hooked to the generator leads through protective relays. A 48-volt battery set forces the field of the alternator and insures a quick surge of power to drive the blower when the engine is started. Use of clean-burning gas improves lubrication economy. Table 1 shows that the 2,000-hp. unit consumed only 858 gal. of lubricating oil in 2,236 hours of operation, an average of 5,212 hp. hr. per gal. of lube. Oil for each engine is cleaned continuously by a large waste-packed filter. Scraper ring oil drains directly to the filter tank which is also connected to the crankcase by an equalizing line arranged so that there is always a gravity flow of oil from crankcase to tank. Oil is picked up from the tank by a motor-driven pump, put through the filter and returned to the far end of the crankcase. Oil is supplied to the bearings and to cool the pistons by an engine-driven pump. A motor-driven auxiliary pump is used in starting and stopping the engine. Periodically, the lube is subjected to laboratory analysis to determine solids content, acidity, and retention of additives.

At the time the 2,000-hp. engine was installed, Goodland put in a complete new cooling system featuring a forced draft cooling tower with a 6,000-hp. rating. The tower and piping are divided so that half the system can be operated independently. Jacket water is circulated by three 1,000 gpm. vertical turbine pumps driven by 15-hp. motors. All the engines are served by a 12-in. header. The engines discharge into a 16-in. return flume, from which water flows to the tower coils. At present two pumps are sufficient to handle needs with the third as a standby. At capacity, however, the tower will require 3,000 gpm. and provision has been made for a fourth pump to continue the standby protection. Raw water is circulated by a pair of motor-driven vertical turbine pumps. A compact alarm panel was designed for Fairbanks-Morse by Paul Loomis, Superintendent of the Electric Department. More than 25 boards have been built on this design. For his own plant, Mr. Loomis also designed and built a control and alarm panel for the new cooling system. Before taking the Superintendent's post in Goodland in 1948, Mr. Loomis was an erecting engineer for Fairbanks-Morse for 15 years. In that capacity, he installed the 1225-hp. and 1600-hp. engines. He also installed the 2,000-hp. unit and designed the plant addition built to accommodate it.

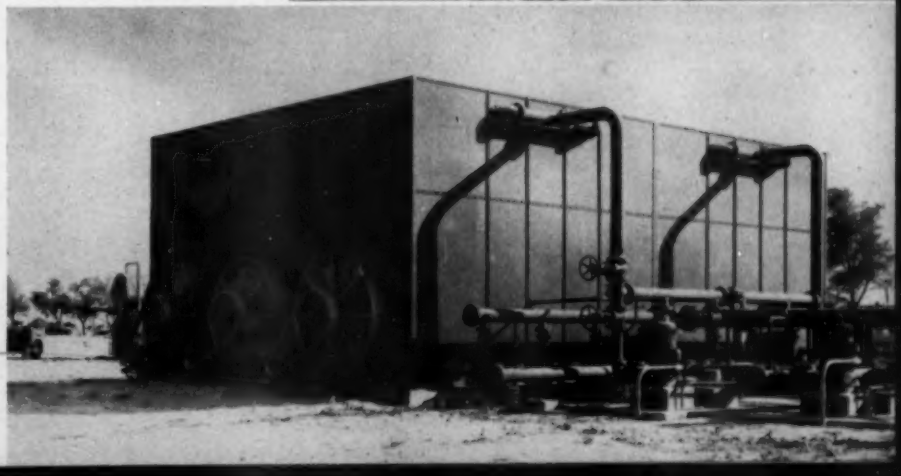
The municipal utility is operated under the general supervision of Mayor George A. Sanders and Councilmen C. Wilbur White, Frank D. Elliott, B. Bob Ward, Basil Robertson, Harlan McDaniel and Mark Jensen. Ray E. Lundy is city clerk. In a period of great municipal expansion, Goodland's power system has met every need without the expenditure of a single tax dollar. With economical dual-fuel prime movers, power profits and community service promise to be higher than ever in the years ahead.

This view of the engine room at Goodland, Kansas, shows three of the five engines. In the foreground is the new 2,000-hp. dual-fuel engine. Behind it is the 1,600-hp. unit. In the background is the 1,226-hp. F-M diesel.



This alarm panel, containing a Brown pyrometer, serves the 2,000-hp. dual-fuel F-M engine. More than 25 of these panels, designed for Fairbanks-Morse by Superintendent Paul Loomis, have already been built.

A completely new cooling system featuring this Diesel Service Co. forced-draft tower with a 6,000-hp. rating was put in at Goodland at the time the 2,000-hp. F-M dual-fuel engine was installed. The tower and piping are so divided that half the system can be operated independently.



ISBELL'S POWER FROM $2,750,000 DIESELS

Open Pit Mining and Construction Jobs in Mountain States Has Lifted Pioneer Construction Family To Heights in Four States

By F. HAL HIGGINS

A fiddling farm hand named John W. Isbell came out of Texas by wagon train to Los Angeles way back in 1868 when the City of the Angels was a mere dusty village with no dreams of super-markets and super-growth into a super-city. Up at Reno, Nevada, today the Isbell family of four sons of old John W. operate one of the most conservative, sound and successful construction firms in the mountain areas.

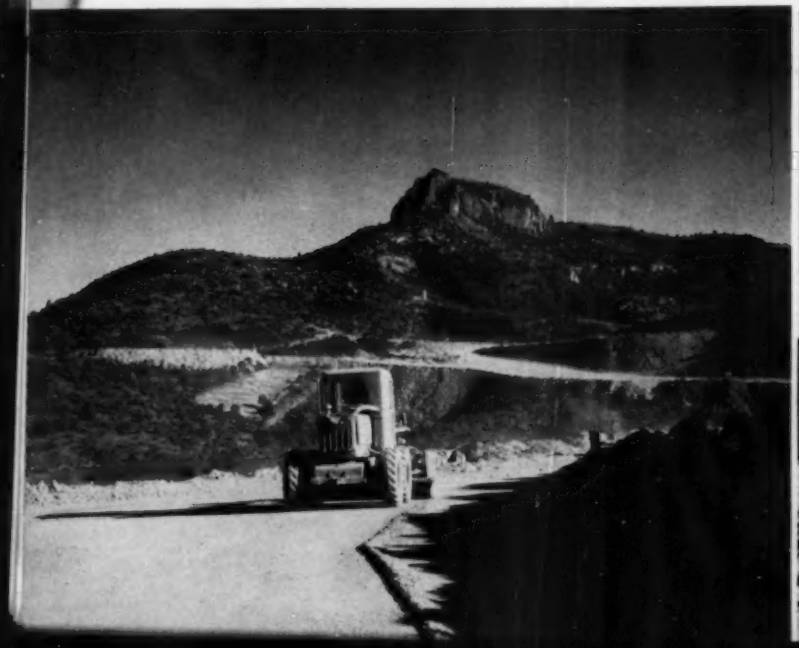
The Isbells came up the hard way via mule power until 1924. Then they bought a Best Sixty tractor and began a slow, tedious and undramatic climb at roads, small dams, airports and so on. Came the war and the magic of strip mining. A strip mining job at Kimberly, Nevada, lifted them into big time. So well did their sound practices learned the hard way over two generations prove out when their big chance came they breezed through from job to job as strip mining came in faster and bigger with war's demands scratching the world for needed metals more important than gold. Silver City, New Mexico, and Ray, Arizona, were the lonely locations of two other strip jobs that put the Isbells into the ranks of big business contractors instead of mere small job bidders with worries about payrolls, patched-up second hand equipment, gas bills, etc. From here on the Isbells could and did buy the best equipment—diesel—and all they needed to handle the jobs they were getting.

Today, the second generation foursome Isbell brothers who run the business are C. V. Isbell, President; Wilmer J., Vice-President; Roy, Secretary; and Guy, Treasurer. Wilmer manages the business from the Reno office where the writer contacted him recently when in Nevada to study several big mining and construction firms. Mr. Isbell kindly consented to an interview and pictures with his friend from the Texas Co. Maybe there is no sentiment in business but maybe the origin of the retired father of the four Isbells has something to do with Isbell Company being one of the biggest accounts Texaco has in the Los Angeles sales zone.

Asked how much diesel equipment the Isbells now have, Mr. Isbell called out his bookkeeper and told him to answer questions on equipment. "You must have a half million dollars in diesel equipment," suggested the visitor. The bookkeeper pulled his small adding machine towards him, turned a few pages in his record books, struck the addition key and answered, "Just about $2,750,000. Here's the list of diesel equipment: 6 EQ Mack trucks with Mack Lanova engines; 67 Euclid wagons with Cummins, GMC and Buda engines; 6 Euclid transports with twin engines—GMCs; 21 power shovels, mostly Murphy engines! 25 Caterpillar D8s; 2 Caterpillar D6s; 3 Caterpillar DW10s; 9 Cat blade graders; 3 Tournapulls with GMC engines; 10 Bucyrus-Erie churn drills with Cat engines; 3 drills with International diesel engines; 1 drill with Cat engine."

A swing around the 10-acre shop and yard at headquarters of the Isbell Construction Co. in Reno revealed a beehive of activity as mechanics and skilled shop labor tested rebuilt engines serviced and repaired blade graders, tractors, shovels, cranes, etc. Outside, a roller operator was laying a new paving in one corner of the yard. A crew of three men was using a diesel truck crane to lift a diesel Cat engine and carry it across the yard to drop it into another piece of equipment requiring a diesel. Here was the nerve center of many jobs scattered over the strip mining areas of the West, growing bigger with each job and now handling jobs for the biggest names in copper, lead, zinc, mercury, manganese, etc.

The pony express, the overland stages, and the buffalo herds that had their days on the great outdoor stage of the West are all gone. But another intrepid pioneer with machines is here in their places. One gets the idea that out here in the great open spaces of the West, the frontiers are just beginning to be broken in a big way and such firms as the Isbells have the key that will rapidly unlock and develop it by uncovering and bringing to industry the hidden metals the nation needs in war and peace. Its constructive and in the great American tradition.



Mountain climbing made easy by diesels: Isbell Construction Co., Reno, Nevada. Here is a Cat diesel blade grader smoothing the road built by diesel bulldozers and shovels to make trucking ore by Cummins-powered Euclid wagons easy.

It's just Drill, Drill, DRILL for the next five years for this battery of Bucyrus-Erie churn drills powered by Cat D4400 engines for one of Isbell's strip mining jobs they have scattered over the rugged terrain of four or five Rocky Mountain states. This scene is in New Mexico, near Santa Rita where they are clearing the overburden for a copper mine.

Vice-President Wilmer J. Isbell, comes out of his office to pose for picture for DIESEL PROGRESS as he chats with a Texaco oil and grease specialist delivering a load of products at the Isbell shop.

Another little "strip tease" on a red hot griddle called Arizona, in the rainless, blistering mountains that test the diesel equipment of Isbell Construction Company in clearing the overburden for an open pit copper mine. The Bucyrus-Erie 120 shovel is powered by a Murphy diesel and is shoveling heavy rocky overburden into the Cummins-powered Euclid wagon.

SHELBINA, MISSOURI

By FAYETTE WEAVER*

MUNICIPAL electric power has a 56-year history in Shelbina, Missouri, a town of only 2000 inhabitants located about 100 miles northwest of St. Louis. Shelbina, whose industries center around farm produce, particularly poultry, eggs, and feed, has gone through five phases in its power production. The latest phase, into which it recently was fully converted, followed modernization of diesel-electric service with three more powerful, full diesel engines replacing the original two small semi-diesels and one full diesel unit.

The Municipal Light & Power plant of Shelbina came into being in 1894 and acquired a small steam generating set of unknown horsepower which supplied direct current. Some time later alternating current was introduced with the purchase of a larger steam unit. When water and sewer systems were built in 1911, a new plant was built and a 165-hp. Corliss steam engine and 125-hp. slide valve engine was installed. This plant still houses the diesel power plant and water department. Steam engines supplied all power until 1923 when finances and credit became so low that a car of coal could not be unloaded until all expenses on the car were paid. The Board of Aldermen then installed two 200-hp. semi-diesel engines which were paid for out of the difference between the cost of coal and fuel oil. The first full diesel engine, a two-cylinder engine of 120 hp., was installed in 1932. The 120-hp., 2-cylinder engine was the first to be replaced by a 6-cylinder diesel, of four times greater horsepower. This 6-cylinder engine, a Baldwin De La Vergne, model VG, was installed during the summer of 1936 and is still in use after 15 years of service. Continued growth of power demand after 1936 necessitated purchase of a 750-hp. diesel engine to maintain safe capacity. This engine, a 6-cylinder 750-hp., 500 kw. Baldwin De La Vergne model VM, replaced one of the 200-hp. semi-diesels in the spring of 1939. The last of the original semi-diesels was replaced by the latest model Baldwin diesel, a series 700, 750-hp. engine. The three Baldwin engines now provide a total capacity of 1980 hp. or 1320 kw. The two 750-hp. engines are used alternately every other week and carry the base load. The 480-hp. unit is used together with one of the 750-hp. units for the peak loads. This schedule provides for an adequate maintenance program and assures unfailing power in the event of an emergency shut down.

This power plant supplies the community and surrounding country with power and light requirements, and other industries in the community, which include two grain elevators that processed 352,000 bushels of soy beans during the 1950 season, two grinding mills operated by 50-hp. motors, a hatchery that hatched 300,000 chicks during the past year, and a 17-ton ice plant. The largest industry in Shalbina is the Producer's Produce Company, a co-operative organization which processes poultry and eggs. All current for lighting the streets of Shelbina, the library, and all city offices is furnished without charge. This amounted to 300,000 kwh. during 1949. The Light and Water Department transfers to the general fund of the municipality from $18,000 to 20,000 each year.

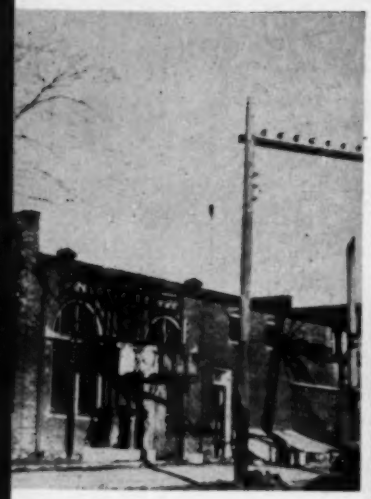
The increase in utilization of electric power in the Shelbina area is shown by the accompanying table. Total kilowatt-hours generated during 1949, approaching 2,500,000 kwh., showed 100% increase in 10 years and 400% increase since 1932. Street lighting, which required 20 to 25 percent of the power generated during the early 1930's, now takes twice as many kilowatt-hours but was only ⅛ of the total generated in 1949. After installation of the first two Baldwin units, the cost per kilowatt-hour was progressively reduced from 1.90 cents per kwh. to 1.25 cents per kwh., until 1944 when subsequent increases in costs were brought about by the rising cost of fuel and lubricants and general post-war inflation. This brought the cost up to 2 cents per kwh. Upon installation of the latest Baldwin engine, cost reductions were again reflected and the present cost per kwh. is 1.84 cents. It should be noted from the tabulation chart that the engine is operated at an average load of only 275 kw. This average load is only about half the full load rating of the 500 kw. During peak periods the engine operates at its full load rating.

Engine accessories include an enclosed water cooling system with an Ames forced draft cooling tower with coils of 2400 hp. capacity and space for additional coils of 1000 hp. All engines are interconnected to this system so that a pump with a capacity of 400 gallons per minute furnishes cooling water to all engines or to one as needed. Cooling water is softened by Zeolite and is further treated with Chromite. Compressed air is used for starting all engines. Two air tanks with 250-lb. pressure and four with 180-lb. pressure are supplied by a two-stage high pressure air compressor and a two-cylinder low pressure air compressor, both motor driven. The lower pressure air is used mainly for blowing a large whistle morning, noon and evening. Each engine is equipped with a set of lubricating oil strainers and the oil is kept in good condition by a Hilco oil reclaimer, of the fuller's earth batch type. The reclaimer is used continuously for 48 hours per week, taking the oil from the engines, through the reclaimer, and back to the engine. The oil thus gives maximum service. Manifolding permits the use of the reclaimer on any one of the engines. Conventional protective devices are used on each engine: low pressure alarm and shut down for lubricating oil, high temperature alarm and shut down, and over-speed stop.

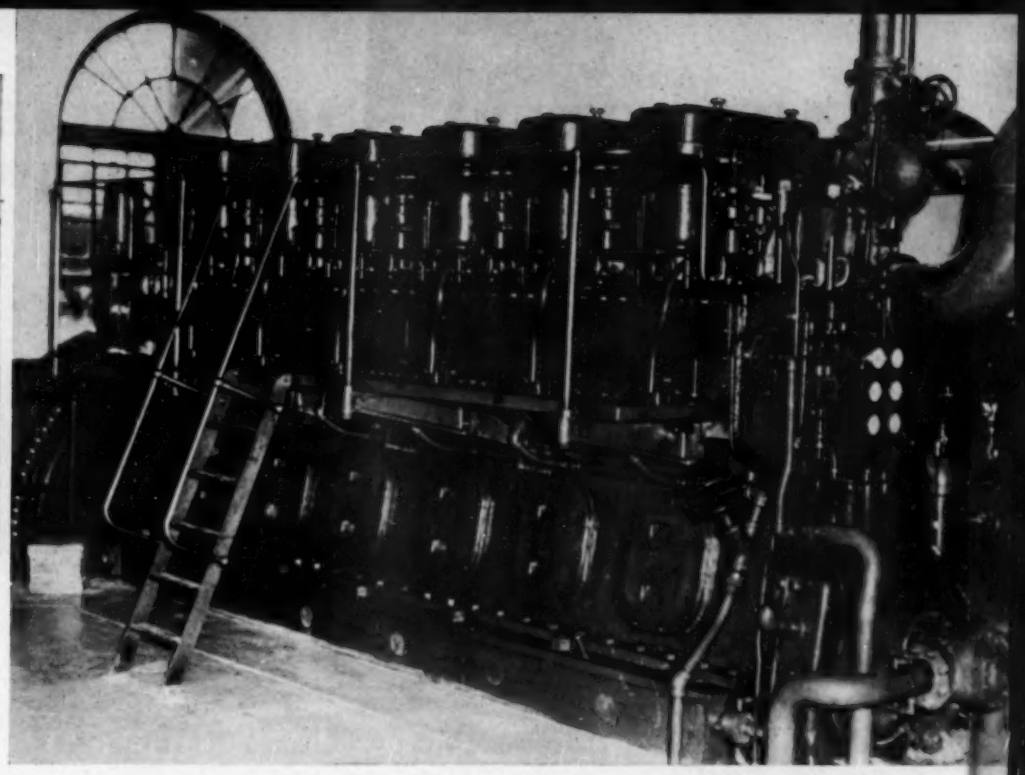
*Power Plant Superintendent, Shelbina, Mo.

POWER RECORD OF THE LIGHT AND WATER DEPARTMENT
SHELBINA, MISSOURI

Year	KWH	Fuel Gallons	KWH per gal.	Av. Load KW	Peak Load	Operating Costs	Cost per KWH	City Lights KWH	%	Year
1949	2,404,236	209,585	11.47	274.5	580	$44,388	1.84c	301,119	12.5	1949
1948	2,220,800	193,944	11.45	253.5	550	45,710	2.06	290,594	13.1	1948
1947	2,054,000	181,459	11.32	237.9	530	41,063	2.00	261,255	12.7	1947
1946	1,749,000	161,625	10.82	199.6	460	31,390	1.79	215,680	12.3	1946
1945	1,754,300	161,332	10.88	200.5	410	22,642	1.29	208,283	11.9	1945
1944	1,769,500	163,659	10.81	201.4	380	21,715	1.23	210,933	11.9	1944
1943	1,566,100	150,974	10.37	178.3	400	20,252	1.29	215,941	13.8	1943
1942	1,364,800	138,736	9.84	154.7	360	20,318	1.49	220,906	16.2	1942
1941	1,350,600	137,266	9.83	153.7	350	19,577	1.59	221,867	16.4	1941
1940	1,225,000	134,522	9.11	139.6	360	18,314	1.49	217,115	17.7	1940
1939	1,204,300	134,245	8.97	137.1	360	18,750	1.56	253,489	21.0	1939
1938	1,105,800	128,308	8.61	126.0	340	15,870	1.44	252,397	22.8	1938
1937	1,039,000	124,405	8.30	118.5	290	16,044	1.54	241,879	23.3	1937
1936	998,800	120,577	8.28	113.5	280	17,408	1.74	208,098	20.9	1936
1935	778,200	99,346	7.83	89.4	240	14,747	1.90	146,354	18.8	1935
1934	776,900	91,429	8.40	88.7	250	11,101	1.43	152,291	19.6	1934
1933	658,600	75,868	8.68	75.1	200	13,212	2.00	150,651	22.9	1933
1932	567,900	68,351	8.31	64.5	190	13,590	2.38	140,014	24.6	1932



Municipal Light & Power Plant, Shelbina, Missouri.



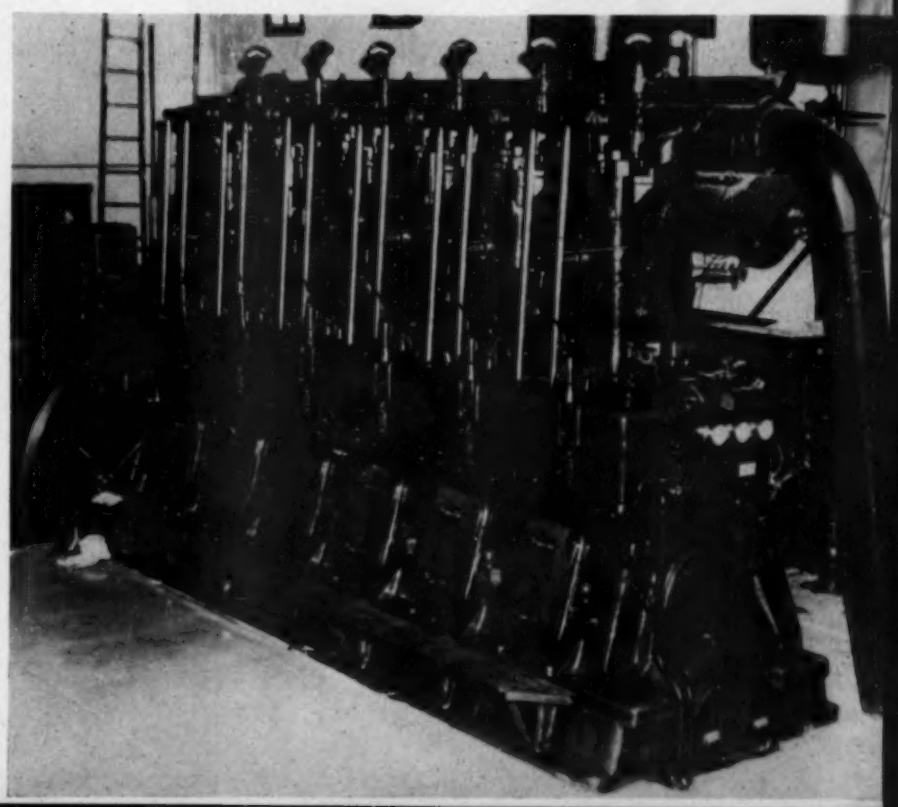
Most recent addition in the municipal power plant at Shelbina, Mo., is a Baldwin, series 700, diesel engine of 750 hp. at 300 rpm. It is a 6-cylinder engine with 17-in. bore, 20-inch stroke, driving a 500-kw. Westinghouse generator.

The City of Shelbina, Mo., can be proud of its municipal power plant. Housed in a modern building, all diesel installation makes an efficient plant with ample capacity to care for the city's needs for power and light. The men responsible for giving the City of Shelbina this all diesel installation are: Mayor P. A. Adams and Alderman R. G. Clapper, Guymon Hatcher, Carl Miles, and J. R. Shultz.

List of Principal Equipment

Engine—Baldwin-Lima-Hamilton 750 hp., 300 rpm., model 706 diesel; 750 hp. model VM; 480 hp. model VG.
Alternators—500 kw., 3-phase, 60 cycle, 2300-volt—Westinghouse.
Air Intake Filter—Cycoil—American Air Filter Co.
Alarm Switches—Detroit Lubricator Co.
Auxiliary Lubricating Oil Pump—Geo. D. Roper Corp.
Cooling Water Pumps—Fairbanks-Morse.
Engine Lube Oil Pump—Geo. D. Roper Corp.
Exhaust Snubber—Burgess-Manning.
Exciter—one 15 kw., 1450 rpm., Westinghouse.
Fuel Filter—Commercial Filter Co.
Fuel Injection Pumps & Injectors—Bendix Scintilla.
Fuel Oil Supply Pump—Geo. D. Roper Corp.
Fuel Shut-Off Valve—Fulton Sylphon Co.
Gauges—U. S. Gauge Co.
Governor—Woodward Governor Co.
Lubricating Oil Strainer—Purolator Products Inc.
Lubricating Oil Cooler—Ross Heater & Mfg. Co.
Lubricating Oil Reclaimer—Hilco, The Hilliard Corp.
Pyrometer—Illinois Testing Laboratories Inc.
Water Cooling Tower—Ames.

Installed in 1936, this Baldwin De La Vergne diesel has given nearly 15 years of service, and is now used for maintaining peak loads and for standby. The model VG, 6-cylinder engine, with 15-inch bore and 18½-inch stroke will deliver 480 hp. at 300 rpm.



MID-CENTURY "EMPIRE BUILDERS" AND "WESTERN STAR"

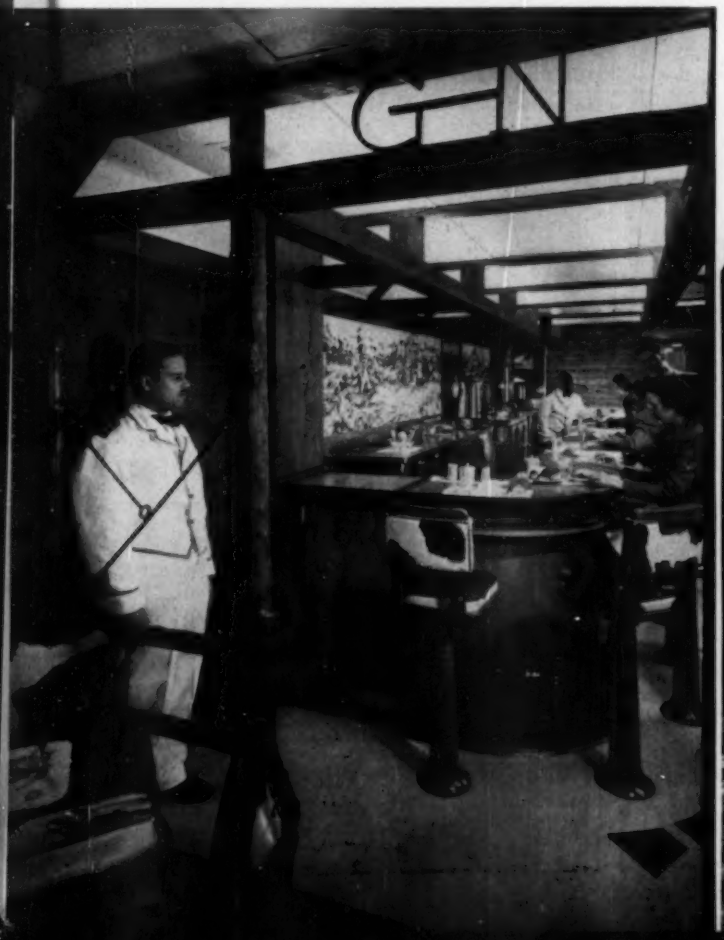
By CHARLES F. A. MANN

ONCE more the Great Northern Railroad has taken the initiative in railroad passenger service to Pacific North Coast points in the quiet but genuinely superlative addition of a fleet of six 15 car deluxe trains to its Chicago Pacific Northwest transcontinental service on June 3rd.

Barely four years old, the streamlined Empire Builder diesel trains, a complete fleet of five trains, became, on June 3rd, a brand new train known as the *Western Star*, while five of the new 15 car deluxe trains took up the service as Mid-Century *Empire Builders*, and the 6th train became part of the *Western Star* fleet, operating on the conventional 58 hour schedule. The reason for this is the 45 hour *Empire Builder* schedule, with quick day turnaround at Seattle and Portland, requires five trains, while the *Western Star*, on the slower schedule, requires six complete trains, hence the *Western Star* equipment represents a pool of 5-1947 *Empire Builders* and a full set of brand new Pullman and ACF-built cars to match.

In operation, the Burlington hauls the Mid-Century *Empire* out of Chicago every afternoon as Train No. 2 at 1 p.m. From St. Paul, the Great Northern takes over with a pool of 3-unit 4500 hp. EMD FP diesels for the run to Spokane and Seattle. At Spokane, two sleeping cars and a day-nite coach are detached and make a fast run to Portland over the Spokane, Portland and Seattle Rwy., jointly owned by the Northern Pacific and Great Northern, in a new connecting train that makes the Portland Spokane round trip daily. On the *Western Star*, this schedule follows the old Oriental Limited departure late at night, arriving at Spokane early in the evening, with 2 cars cut out for Portland, and arriving in Seattle early in the morning, with the regular night Portland-Spokane train hauling the connections in both directions. The *Western Star* is likewise powered with 3 unit EMD diesels of 4500 hp., except on the short stretch between Skykomish and Seattle, where 2-unit 4000 hp. EMD passenger type diesels, geared for higher speeds on easier grades, bridge the gap between the Cascade mountain electrification and the Seattle terminal. The regular 3-unit diesels terminate their run from St. Paul at Wenatchee.

Enjoying a meal in western surroundings—the coffee shop-lounge car of Great Northern Railway's *Empire Builder*. To the right: *Western Star* taken in the Cascade Mountains of the state of Washington.



The famous old Oriental Limited, first started in 1905, which ran the fast Grade A passenger run until 1931, then revived in 1947 when the first streamlined diesel Empire Builder went into service, has at last been retired and the name added to railroad history. The twin new trains will carry on.

Basically, the five new 15 car *Empires* are evolutions from the four years experience operating the 1947 Pullman-built diesel trains. Refinements based on practical operation through the varied territory traversed by our northern-most Transcontinental railroad; improved handling with diesels, and considerable more luxury inside the trains resulting from far greater popularity and use by the travelling public than the slightly pessimistic G.N. officials could foresee when the neat-but-not gaudy Empires were first ordered in 1945. Revenues far exceeded estimates and modified liquor laws made the drinking-dining activity on these trains far more lucrative than anybody could imagine six years ago. The diesel power on both new trains, however, sticks to the marvelous simplicity of the General Motors freight passenger 8 wheel 1500 hp. diesel unit, which can whip up to 75 miles speed, yet maintain high tractive effort at lower speeds and negotiate the stiff curves easily and safely.

Each train consists of a mail-baggage car, baggage-dormitory car; a 60 seat shorthaul daycoach; three 48-seat coaches for night travel; a coffee-shop-lounge car, principally for coach passengers; a full diner; six sleepers and a full observation-lounge car. Every other car carries a small diesel generator set to boost power supply of the cars for air conditioning. Pullman Standard built the sleeper coaches, the regular sleepers and the mail baggage cars, while American Car & Foundry built the magnificent coffee-shop lounge cars; diners, observation-lounges; 60-seat coaches and baggage dormitory cars.

Among the host of special features are 7 different types of sleeping car accommodation—from uppers to drawing rooms. All rooms have closed off toilet facilities. Then there are automatic door openers, running ice water in all rooms; lounge-type daycoaches with twin ladies powder rooms; special windows with radiant heat panels; train-wide PA system for radio and announcements as well as wire recordings, and the magnificent "Ranch" cars.

"The Ranch" is a genuine western cattle country version of a tavern, replete with aged and sandblasted board walls, leather panelling; leather upholstery and Cattle Brand decor, right down to the G bar N brand registered by the GN railroad as its own cattle brand. The diner, and observation-lounge car, are by deliberate contrast, Big City sophisticated in carved glass, woodgrain Formica, and the modern lounge touches found in the big hotels and clubs. Meals by advance phone reservation are a standard arrangement to avoid standing in line.

The deluxe Empire Builder equipment now only four years old, with addition of enough cars to give six instead of five complete 14 car trains, sailing under the *Western Star* banner, gives twin daily service from Chicago to the Pacific Northwest. The new *Empire* will carry 335 passengers while the *Western Star* will carry 330. *Western Star* varies only in that it contains five sleepers instead of six, and the observation car carries three bedrooms, and the coffee shop car carries the crew's dormitory, thus giving a full size baggage car.

All the rest of the details of both trains embody all that is "New 'Til Now" in world railroading. Both feature tightlock couplers, electropneumatic braking; colorful exteriors; four wheel roller bearing trucks; sound proofing and fast-acting air conditioning, and all riding devices to give smooth travel in rough mountain country, not to mention air conditioning to keep cool in summer and warm in the icy blasts of winter.

Principal diesel servicing is at Wenatchee, Spokane, Whitefish, Havre, and St. Paul, with quick turnarounds and high monthly mileages. Probable utilization of the *Western Star* equipment on the long Seattle turnaround time for the Seattle-Portland round trip in the 3-system pool passenger train service will be possible for the diners, coaches and head-end cars to get extra mileage utilization from the heavy investment. Setout sleepers for Great Falls, to and from Chicago; a sleeper and coach are set out at Spokane for Portland and a Spokane-Seattle sleeper are all handled on the *Western Star*. With the June 3 additions to Great Northern's fleet of diesel passenger trains, this system is now the best equipped of any of the three Northern transcontinental railroads between St. Paul-Minneapolis and the North Pacific Coast.

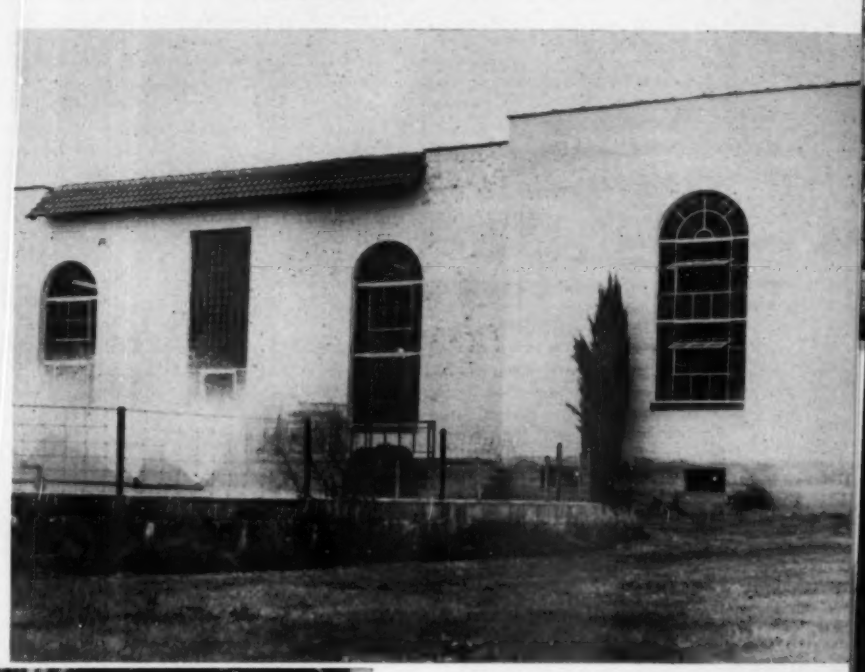
Lounge car on the new *Empire Builder*.

MODEL DIESEL PLANT SERVES ST. GEORGE

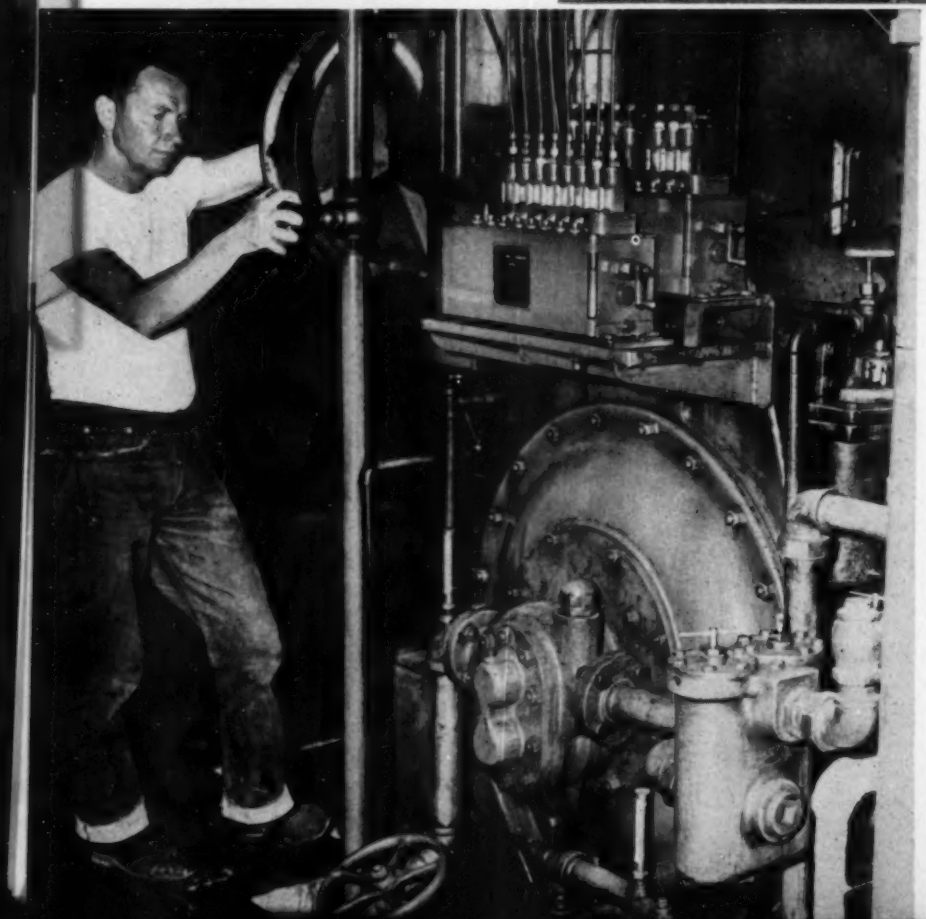
By JAMES JOSEPH & E. J. WATTS

ST. GEORGE, Utah (Population 4,545), in the heart of Utah's "Dixie," is a modern community with a diesel plant that is a model for medium size municipal installations. Settled in 1861 by a company of Mormon pioneers sent there by Brigham Young, St. George is primarily an agricultural and tourist center. It was founded in the expectation that cotton planting would become the chief industry; however, it was never raised in commercial quantities. Because of the mild climate, semi-tropical vegetation abounds. St. George, with its fine motor lodges is a convenient stopping point for tourists. It is located approximately midway between Salt Lake City and Los Angeles and is only 45 miles from Zion National Park. Bryce Canyon National Park and the North Rim of the Grand Canyon are also conveniently reached from St. George.

The diesel plant commenced operations in 1942 with two Worthington type DD normally aspirated four cycle direct injection diesel engines. The DD 7 unit has a rated capacity of 373 kw., and the DD 8 a rated capacity of 429 kw. at 2800 ft. above sea level. The engines are directly connected to General Electric 2300 volt, 60 cycle, 3 phase 360 rpm. engine type generators. Jacket Water cooling is accomplished by means of a spray pond, with the pond water circulated through jacket water heat exchangers. An interesting feature of the installation, is the use made of part of the heat rejected by the engines. An outdoor municipal swimming pool was constructed adjacent to the power plant and the pool water is heated by means of a heat exchanger installed in engine jacket water circuit.



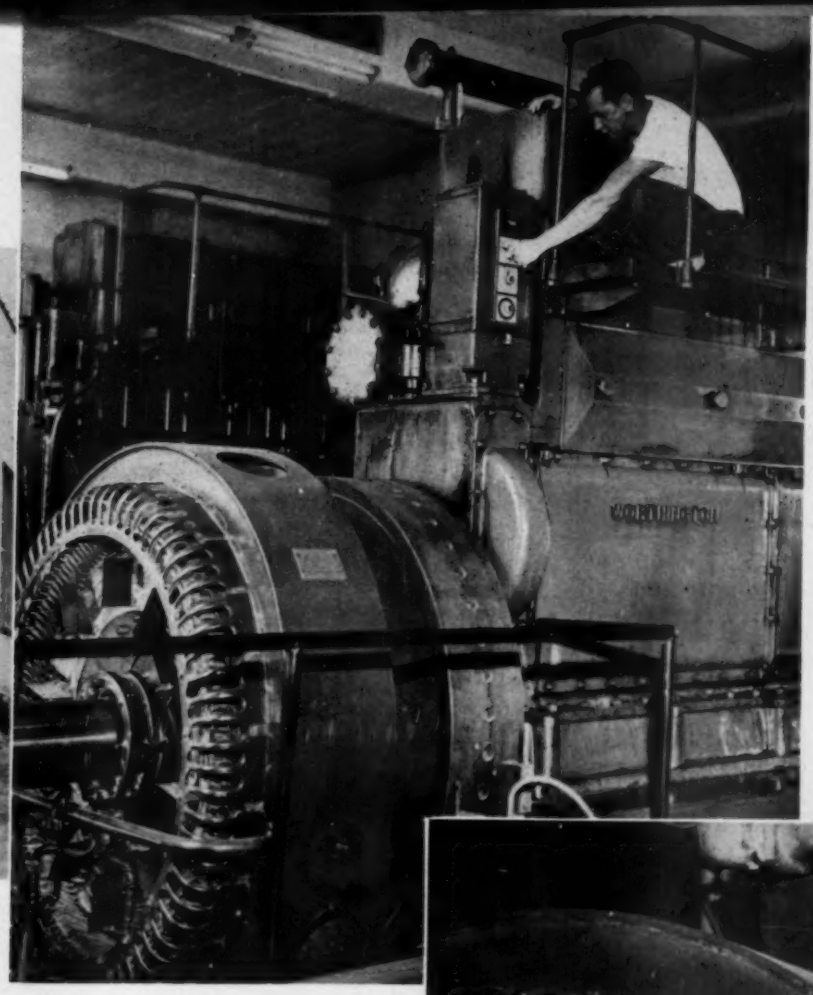
The diesel plant at St. George, Utah, is a part of the water-works. A well-designed functional addition.



Adjusting air valve on 429 kw Worthington diesel at St. George, Utah.

Because of the growth in load, a Worthington SEH-8 16" bore by 20" stroke 360 rpm. turbocharged four cycle direct injection engine directly connected to a General Electric generator was installed in 1947. This engine is rated 1200 kw. The spray pond is of sufficient capacity to handle the jacket water cooling requirements of the third unit. As is the trend throughout the nation, the power demand continued to grow and as a result of the increased demand, a fourth Worthington engine, an SEH-8, was installed in 1949. Cooling of this engine is accomplished by means of two Worthington-type WCZ evaporative coolers, one for jacket water and the other for lubricating oil temperature control. Because of continued load growth, another Worthington SEH-8 engine will be installed this summer. The new engine will replace the DD 8 on the same foundation.

A small hydro plant, remote controlled from the

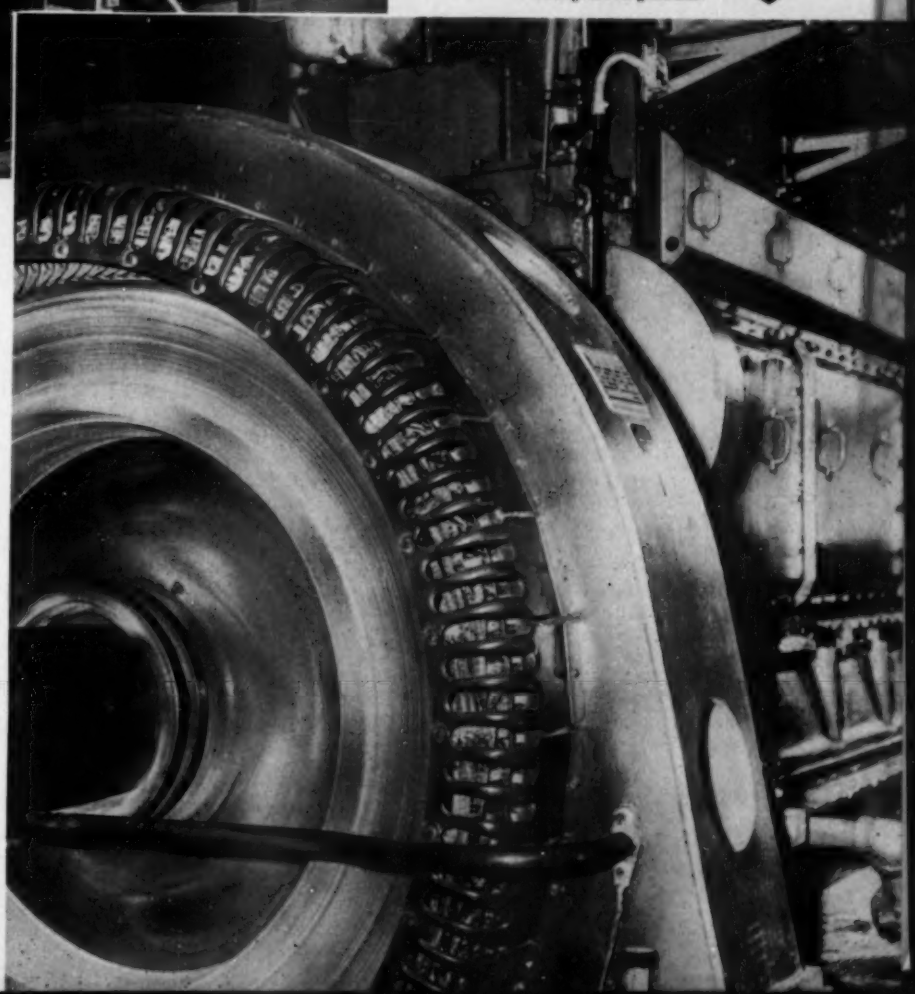


able savings in fuel cost by burning this fuel at 10.8 cents per gallon compared to 12.2 cents for straight diesel fuel. During a typical month, June, 1950, of the 35,760 gallons of fuel consumed by the four engines, 32,750 gallons were wax distillate, and only 3010 gallons were straight diesel fuel. This reduced fuel cost, coupled with good plant operation, has resulted in the St. George plant producing and distributing power for as low as 1.8 cents per kilowatt hour. When you consider the fact that the St. George diesel plant is 55 miles from the nearest railroad and all supplies and equipment must be trucked to the plant, the overall cost of generating and distributing power is ramarkably low. Of further interest, is the fact that the St. George power rates are below the state and national average, and the plant is in sound financial condition.

K. J. Parkinson, Superintendent of Utilities, is in direct charge of the power plant. The affairs of the Municipal Power Plant are conducted by the Utility Commission; M. M. Bentley, Chairman; LeRoy H. Cox and Harold S. Snow, Members; Clair S. Terry, Secretary.

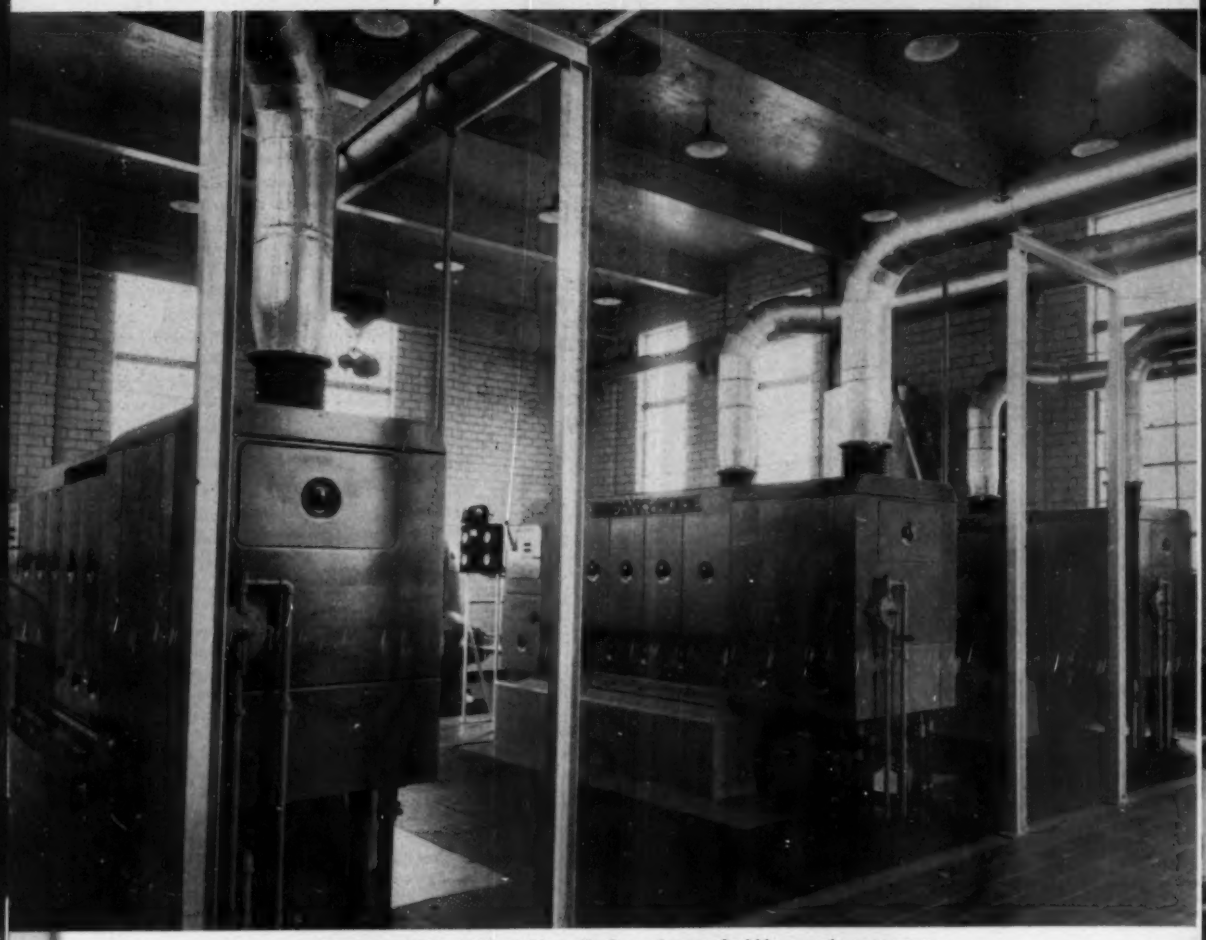
Operating engineer at work on the Worthington diesel engine at St. George, Utah.

Close-up of the 1170 kw Worthington diesel direct connected to GE alternating current generator.



diesel plant, with a rated capacity of 420 kw., generates from 50 to 300 kw. continuously. The hydro produced about 15% of the total kilowatts generated in 1950. The total kilowatt hours generated last year by both the diesel and hydro plants was approximately 8,000,000. This output serves the town, in addition to 26 rural customers, over its own transmission lines. A high line connects the St. George plant to the Southern Utah Power Company facilities in Cedar City, 55 miles to the north, over which power is interchanged between the two systems on a standby basis. All circulating water pumps in the plant, air starting equipment and fuel transfer pumps are Worthington built. Each engine is equipped with a Honan Crane bypass-type lubricating oil filter with heater strips. Exhause silencers are Maxim type MUC. Each engine is equipped with automatic alarms and shut-down devices for high water temperature, low water pressure, high oil temperature, low oil pressure and overspeed shutdown.

For several years the diesel plant has been using a low cost wax distillate fuel with a pour point of plus 70° F. The fuel is stored in an above-ground, uninsulated, 24,000 gallon horizontal tank, heated by means of engine jacket water circulating through a pipe coil in the bottom of the tank. St. George has experienced good performance and an appreci-



These three 325-hp. Fairbanks-Morse diesels can be started within one minute to pump the streets of the Corpus Christi business district dry. This pumping station is completely self-sufficient.

KEEPING CORPUS DRY

By WILLIAM H. GOTTLIEB

FROM time to time through the years the big wind shrieked across the Mexican Gulf and whipped the placid waters of Corpus Christi Bay into mountainous, destructive waves. The waters rolled over the shore line, flooding the low land that includes most of the business section of the city. From time to time, tropical rains fell on Corpus—as much as two inches in less than half an hour—and again the low area was flooded and expensively damaged. But Corpus Christi, Texas, is too big and too busy a city to bear these onslaughts without counter action. In the years 1938 to 1940, the first big protective measure was taken, construction of a 14-foot seawall, extending two miles from the high bluff, where it circles toward the sea South of town, to the port area, which has a natural elevation of 15 feet.

This would serve to keep the bay waters out, even if they reached the 11-ft. levels of the typhoon of 1919, but the seawall left the main business district and the short front in a big, low pocket without natural drainage. This area ranged in elevation from 3½ to 8 ft. above sea level. First essential was a network of storm sewers to carry off rain water. Second requirement was a series of outlets through the seawall to permit run-off at normal tides with gates to keep the sea out at abnormally high tides. Finally, provision had to be made for discharge of rain waters at high tide. With Myers & Noyes as consulting engineers, Mayor Leslie Wasserman, Director of Public Works H. H. Stirman and General Superintendent of Public Utilities J. W. Cunningham developed a drainage system designed to meet all the problems. A network of storm sewers was constructed, covering every block in the low area and draining to a 9-foot U-shaped sewer parallel to the waterfront. A series of outflow lines with automatic gates were provided to permit drainage by gravity whenever the tide was below 4 ft.

Final step was the construction of two pumping stations to handle all drainage when tides blocked the normal outflow and to dispose of rain water when rainfall was too heavy for normal gravity flow to clear. Station "A" has three 54-in. vertical Fairbanks-Morse pumps, each rated at 75,000 g.p.m. at a 9-ft. head. Each pump is driven by a 325-hp. model 31A8½ Fairbanks-Morse diesel through Farrel-Birmingham gears which reduce an engine speed of 514 r.p.m. to a pump speed of 301.6 r.p.m. Normally, water flows by gravity from the 9-ft. sewer through an 8-ft. concrete outflow sewer which extends 100 yards beyond the seawall into the bay. When tide rises and threatens to back up in this line or when rain is so heavy that pumps are needed to prevent flooding of the streets, a gate is

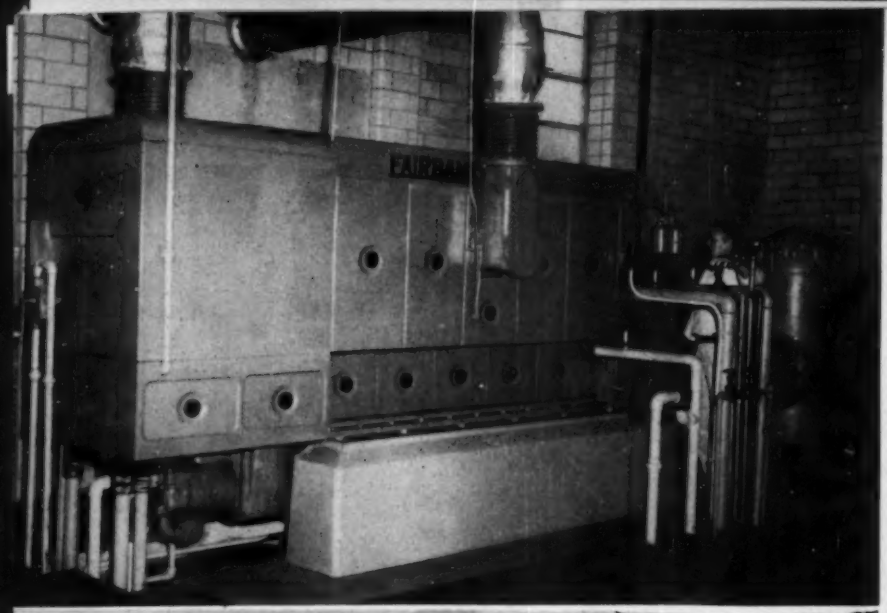
In a tropical setting this pumping station protects Corpus Christi against damage in tropical storms. Station "A" houses three diesel-driven Fairbanks-Morse pumps. Shown here are the Burgess exhaust snubbers and the American air filters.

swung across the outflow sewer and uncovers an opening into the pump suction chamber. The pumps discharge into the outflow sewer beyond the gate, providing positive drainage even at record tide levels.

Station "B" is located at an elevation of 3½ ft., the lowest spot in town. At this station there are two pumping units, a 54-in., 75,000 g.p.m. Fairbanks-Morse pump driven by a 325-hp. F-M diesel, and a 36-in., 27,000 g.p.m. Fairbanks-Morse pump driven directly by a 75-hp. F-M electric motor. The electric pump is automatically controlled by the level of water in the suction chamber and guards against rain water damage in the lowest section of the city. The pump discharges into an elevated outfall from which the water flows to the bay by gravity. It was deemed important to make the plants self-sufficient and capable of functioning in emergency without any outside source of power. After all, the plants' big job is to pump the town dry when typhoons are whipping up the tide, and the high winds are likely to disrupt power transmission lines. Heavy-duty diesels were chosen to insure dependable performance. Chief Operator G. B. Dodds reports that the diesels can be started and put to work in one minute. It takes four minutes to swing the main sewer gate closed.

Wind and rain don't give much warning in this part of the country and the city keeps an operator on duty 24 hours a day. Since the two plants went into service in July, 1949, Corpus Christi has had several heavy rains which would have damaged the city were it not for the drainage pumps. On one such occasion, 2 in. of rain fell within 30 minutes. Even in the case of light rains, the diesel-pumps provide a valuable safety factor. If the sewers are filling up, the operator runs two diesels for 30 minutes, which usually is enough to empty the sewers and provide 5,000,000 gallons of underground storage capacity. On top of this, the two plants have a combined pumping capacity of 527,000 g.p.m. The city has spared nothing to make these stations attractive, efficient and dependable. Built in a setting of palm trees, bright flowers and green lawns, the buildings are of steel-reinforced concrete and Austin stone. Interiors are lined with tile. Diesel fuel is stored in a 550-gal. underground steel tank for each engine and is picked up by the engines' own supply pumps and sent through duplex bag-type filters to the fuel injection pumps. Lube for each diesel is circulated under pressure to all bearings and cylinders by an engine-driven pump.

Oil goes also to cool the pistons and passes through a shell-and-tube oil cooler. Soft cooling water is put through the engine jackets by an engine-driven centrifugal pump and is cooled in a heat exchanger. Another gear-driven pump takes raw water from the sump, puts it through the exchanger and back to the sump. Thus, all essential auxiliaries are driven by the diesels themselves. For engine starting, each plant has a motor-driven air compressor and storage bottles. Here again the safety factor has been provided in the form of a



compressor driven by a small gasoline engine. There is also a 4-kw. gasoline engine-generator unit at each station.

For safety and ease in operation, there is a gauge board near each diesel with pressure and temperature gauges, alarms on lube pressure and temperature and water temperature, and a multi-point exhaust pyrometer. Scavenging air enters through three-unit impingement-type filters and exhaust gases vent through vertical snubbers.

Corpus Christi Bay is a calm body of water. The barrier islands serve as a damper and keep tide variations between minus 1½ ft. and plus 2½ ft. most of the time. Only the winds ignore the barrier and push the tides to higher levels. The city has made a considerable investment in protection but officials know that just one combination of high tide and heavy rain would do more damage to an unprotected town than the entire cost of the plants. Corpus hopes the typhoons will not strike, but the citizens know that they have diesels and pumps that will give them maximum protection. They have proven themselves in service.

Principal Equipment Listing

Engines—Four 325-hp., Model 31A8½ diesels operating at 514 r.p.m. Fairbanks-Morse.
Electric motor—One 75-hp. motor. Fairbanks-Morse.
Pumps—Four 54-in. vertical pumps, 75,000 g.p.m. capacity; One 36-in., 27,000 g.p.m. pump Fairbanks-Morse.
Reduction gears—Farrel-Birmingham Co., Inc.
Governors—Woodward Governor Co.
Fuel oil filters—Wm. W. Nugent & Co., Inc.
Lube Oil—Teresso 65. Humble Oil Co.
Oil coolers—Ross Heater & Mfg. Co., Inc.
Heat exchangers—Ross Heater & Mfg. Co., Inc.
Air compressors—Fairbanks-Morse.
Gasoline engines—4-kw. engine. Kohler Electric.
Snubbers—Burgess-Manning Co.
Air filters—American Air Filter Co., Inc.
Pyrometer—Alnor, Illinois Testing Labs.
Gauges—Marshalltown.
Traveling crane—Manning-Maxwell.

Top—Chief Operator G. B. Dodds adjusts cooling water flow for the 325-hp. Fairbanks-Morse diesel at Station "B." Like the engine at Station "A" this diesel drives a 54-in. Fairbanks-Morse pump.

Located at the lowest spot in the city, Station "B" provides continuous automatic protection against flooding. The single F-M diesel draws scavenging air through an American air filter and exhausts through a Burgess snubber.

The diesels drive the big Fairbanks-Morse pumps through Farrel-Birmingham right-angle gears which reduce engine speed of 514 r.p.m. to pump speed just over 300 r.p.m. Also seen here are the Woodward governors and the engine gauge board with Marshalltown gauges and Alnor pyrometers.

STEAM TO DIESEL FOR TUG FLEET

Great Lakes Towing Company Fleet of Fifty Tugs In Process of Being Modernized to Increase Their Efficiency

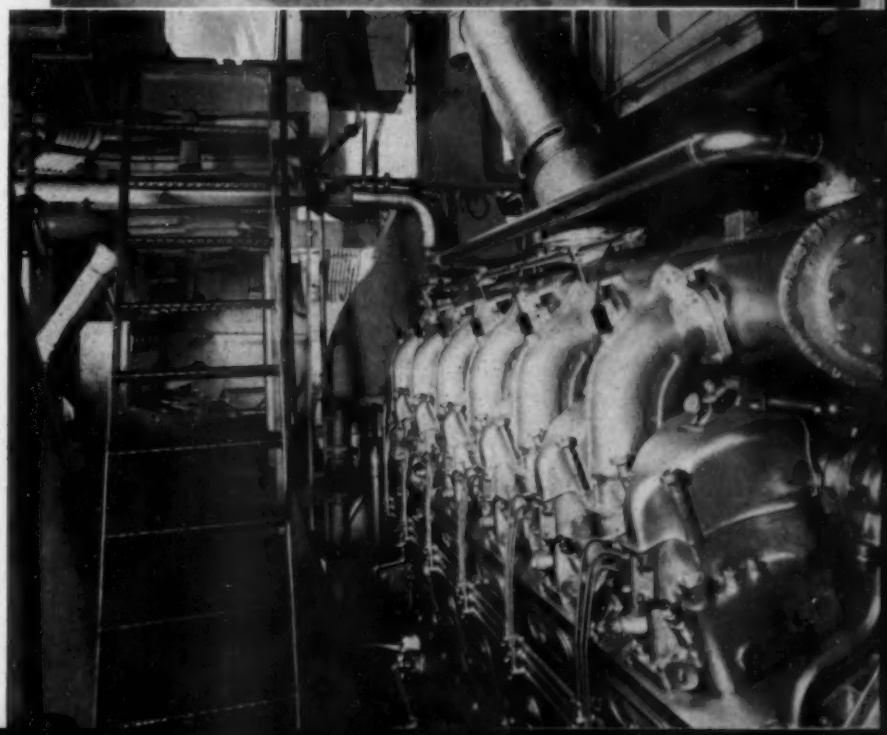
By LAURENCE C. TURNER*

THE Great Lakes Towing Company placed its first tug in service on Lake Erie in 1899. Since then, it has expanded its operations until, with its four subsidiaries, it now provides towing service over the entire chain of lakes. Harbor towing is performed in the Ports of Buffalo, New York; Erie, Pennsylvania; Conneaut, Ashtabula, Fairport, Cleveland, Lorain, Huron, Sandusky and Toledo, Ohio; Detroit and Sault Ste. Marie, Michigan; Duluth, Minnesota; Superior, Wisconsin; Chicago and South Chicago, Illinois; Indiana Harbor, Gary and Buffington, Indiana. In addition to harbor tugs, the company operates two tugs designed and equipped expressly for lake-wide towing. It also operates the 746-ton wrecking-steamer *Favorite* which is designed and equipped for wrecking and salvage service.

In 1948, the company's fleet comprised fifty tugs, all of which were steam-powered, consistent with marine engineering practice that has prevailed for so many years on America's inland waters. In 1949, recognizing the trend to larger cargo ships on the Great Lakes, and anticipating need for greater ton-

President, The Great Lakes Towing Company, Cleveland, Ohio.

The pilot house of the recently converted *Ohio* of the Great Lakes Towing fleet. The *Ohio* is one of 17 tugs of this company now powered with GM diesel propulsion machinery. This view not only shows the pilot house control stands but also the "steering lever" which is distinctive on Great Lakes Towing tugs.



An engine room view of the recently converted Great Lakes Towing Company's tug *Ohio*. The *Ohio* is one of 17 tugs now propelled with GM diesel machinery. Each of the tugs is powered with a 12 cylinder, 2 cycle GM diesel engine developing 1200 bhp.

nages of iron ore in times of emergency, which would require greater speed and power in tug service, the company considered re-powering the tugs. While there was then but little experience in the operation of diesel-geared and diesel-electric tugs in harbor towing on the Great Lakes, it was decided to try out these types of propulsion. The first tugs converted were powered by GM diesel-gear drive and placed in operation in 1949. The first tug equipped with GM diesel-electric drive was placed in operation in June, 1950. By that time, the present national emergency was upon us. Although the company's experience with diesels was brief, it was deemed adequate to justify speeding of the conversion program so as to complete as soon as possible a total of eighteen tugs. Seventeen are now in service. Of these seventeen, eight are diesel-gear drive and nine are diesel-electric drive, all powered by General Motors.

A number of factors influenced the decision to use diesel engines. In the first place, the use of water-tube boilers was considered undesirable because of the polluted and muddy waters of the rivers and harbors. The size of the tug was such that it was not feasible to install a suitable steam plant to produce more than 800 hp. The space available would not permit the necesary auxiliaries. It was believed that the diesels would produce the necessary extra speed and power with greater efficiency and lower fuel costs as compared to the old coal-fired steam equipment. The diesels would eliminate the smoke nuisance and make available pilot-house control of engines, a most important advantage. Other considerations were the fact that the two-day fuel cycle of the steam tugs would be expanded to 30 days; that there would be no loss of service for boiler washing, and that the power plant could be shut down when the tug was not in use, resuming operation immediately as compared to four hours required by steam tugs to get under way again. Power would not only be greater, but more constant. This constant availability of greater power is of real importance in assisting the Great Lakes fleet in moving the maximum volume of iron ore throughout the current national emergency.

Conversions to date have entirely justified the company's decision. In some of the ports where conditions demand the maximum of flexibility and maneuverability in tug operations the diesel-electric drive has demonstrated extraordinary efficiency. In other ports, the diesel-gear drive has been completely satisfactory. Most of the company's tugs range from 90 to 99 gross tons, and their new equipment yields around 1200 bhp., compared with about 700 ihp. before the conversions. The company recently purchased the 110-foot tug *John Roen* which is to have her steam power replaced with a General Motors Model 16-278A diesel-electric installation of 1600 bhp. The *John Roen*, like the company's tug *America*, which already has been converted to diesel-gear drive, and like its tug *Superior*, which will be converted to diesel-electric drive, will be designed for use in outside towing and equipped with living accommodations for her crew. Harbor tugs are operated by three crews rotating in eight-hour shifts, plus relief crews substituting when regular crews have days off. No living facilities are provided on these tugs. The harbor tugs are crewed by four men, while the outside tugs carry thirteen.

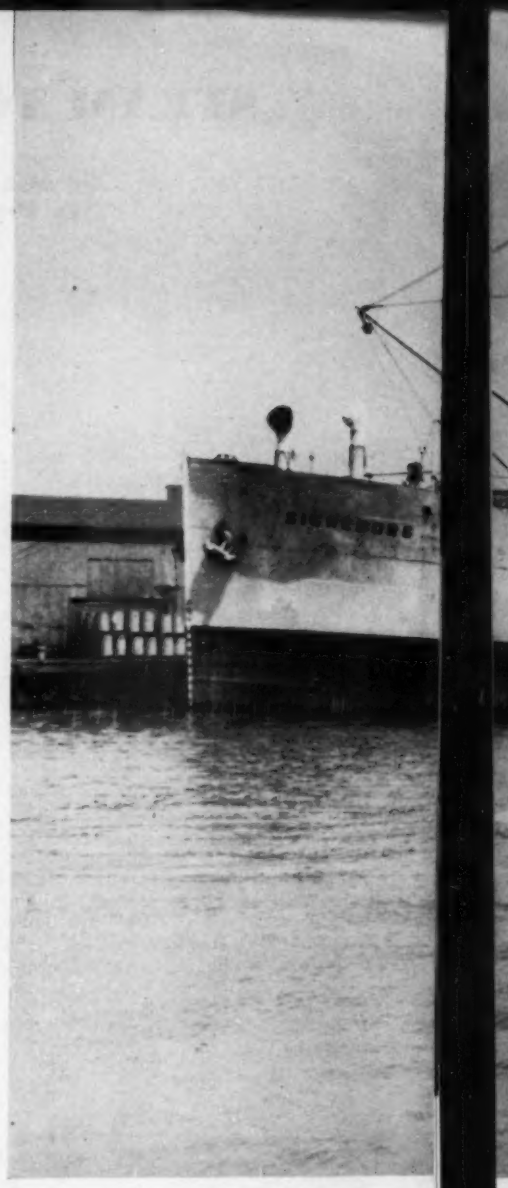
The operating crews of the tugs have welcomed the conversion with enthusiasm. Approximately eighty engineers have attended the training school operated by the service department of the Cleveland Diesel Engine Division of General Motors. It is especially interesting to note that the ages of the engineers who have completed this course and are satisfactorily operating on the diesel tugs range up to seventy-five years, which indicates that even "dyed-in-the-wool" steam men are interested in learning about the more modern form of diesel power and can become expert in its use. In making the conversions, all houses and decks of the tug were rebuilt, designed to accommodate the new power and to increase the efficiency of operation.

Cabins are lower, to improve visibility, and shorter, to allow the tow bits to be moved forward for greater maneuverability. Electric-hydraulic, ram-type, steering engines, designed by R. C. Ryan, Chief Engineer of The Great Lakes Towing Company, were installed, and steering is done with a lever in the pilot house instead of with the usual wheel. This special steering equipment was designed to supply a need for top maneuverability, which could not be obtained with available standard equipment. This need arose from the necessity of handling large vessels in narrow and restricted channels and dock areas where fast rudder changes are vitally important.

Preliminary design, engineering and specifications were the work of R. B. Cooke, of Tams, Inc., New York City. Installation of engines, construction of superstructures and fitting out was accomplished by Paasch Marine Service, Erie, Pennsylvania, Defoe Shipbuilding Corporation, Bay City, Michigan, and the Cleveland Shipyard of the Great Lakes Towing Company. The re-powered tugs are doing everything that was expected of them. They are handling vessels with greater speed and efficiency and, in addition, have proved more suitable in ice-breaking operations which mark the opening and closing of every Great Lakes navigation season. Their increased power was graphically demonstrated in a test made at Conneaut Harbor, Ohio, when the 1200-hp. diesel tug *North Dakota* was lashed to the steam tugs *Minnesota* and *Kentucky*, stem-to-stern on either side of her. When all tugs were working full ahead, the *North Dakota* pushed the steam tugs backwards about one mile per hour.

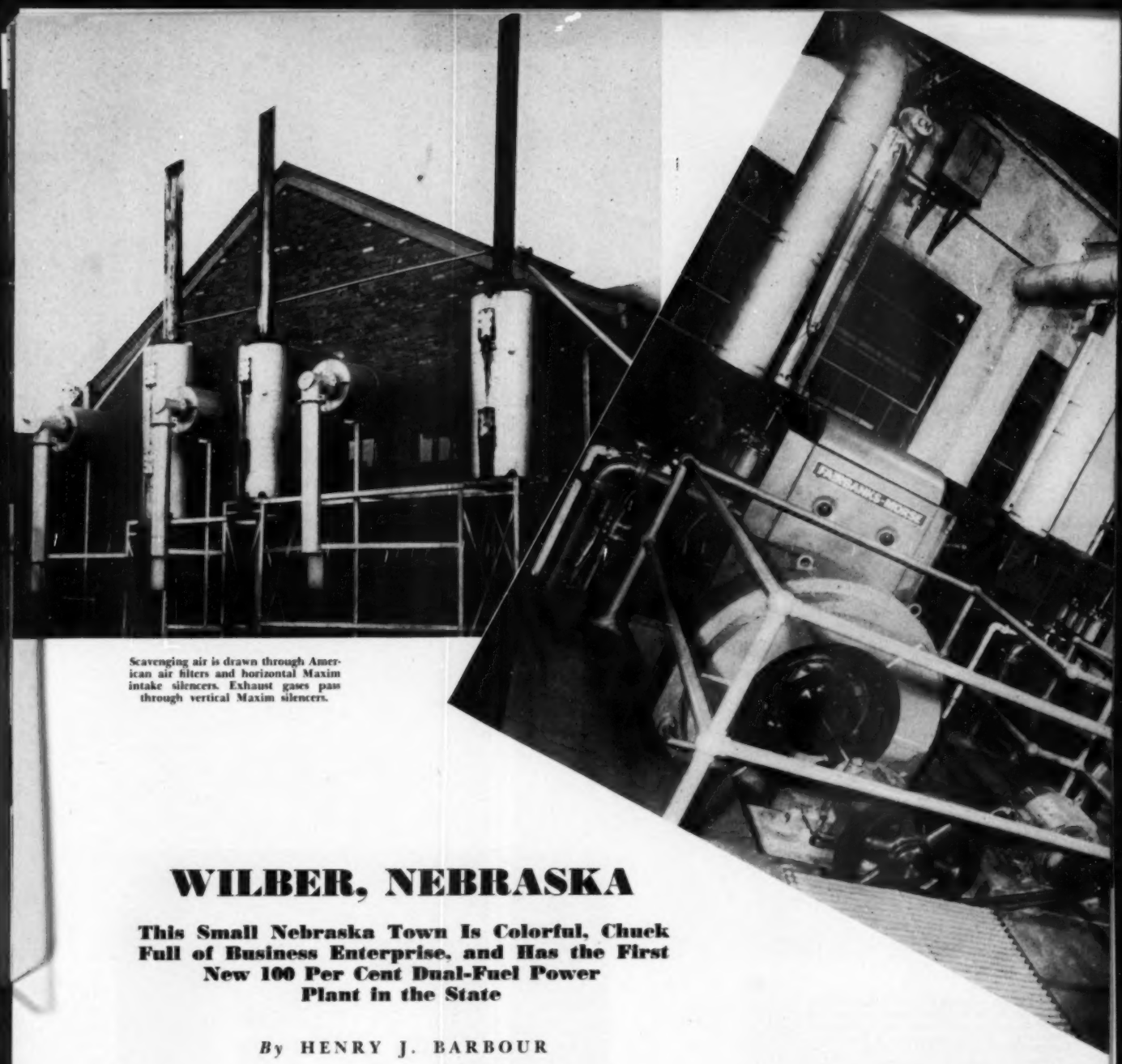
It has been my pleasure to see our company's dieselization program through to its present stage. The program has produced all of the desired results and our operation is particularly benefiting from the increased speed, power, efficiency, maneuverability and economy of the tugs which now are in operation. The conversions have placed this company in position to make a greater contribution to the magnificent effort which the Great Lakes shipping industry is putting forth to carry heretofore unheard-of tonnages of iron ore and other cargoes to supply vital defense needs.

much of the success of the conversion program has been due to the cooperation of the Cleveland Diesel organization, headed by George Codrington, Vice-President of General Motors. Valuable assistance and sound advice were given by the General Motors organization in the planning stages of our program. Many of our engineers attended the General Motors diesel school, as mentioned previously; and during actual conversions much expert advice and assistance was given by General Motors technicians. They rode the tugs during their early operation to assist in the orientation of the crews and to aid in the solution of any problems arising. We have found the machinery—both diesel-gear drive and diesel-electric drive—to be efficient and dependable. Mr. Codrington has personally interested himself throughout the program and has given generously of his time to help make the project a success. Our company will pursue its dieselization program so as to keep abreast of the needs of the Great Lakes vessel fleet.



The recently converted Great Lakes Towing Company's tug *Ohio* in the Cuyahoga River at Cleveland, Ohio. The *Ohio* is now powered with GM diesel-electric propulsion machinery. In the background is the skyline of the City of Cleveland and Swedish ship *Signeborg*. The *Signeborg* is one of the many types of cargo vessels which are docked by Great Lakes Towing equipment on the Great Lakes.

Laurence C. Turner, President, Great Lakes Towing Company, Cleveland, Ohio. A native of New Orleans, he was District Manager of Swayne & Hoyte, Ltd. Steamship Company, New Orleans, La., and during the war he was Director of Water Transport Department of the Office of Defense Transportation.



Scavenging air is drawn through American air filters and horizontal Maxim intake silencers. Exhaust gases pass through vertical Maxim silencers.

WILBER, NEBRASKA

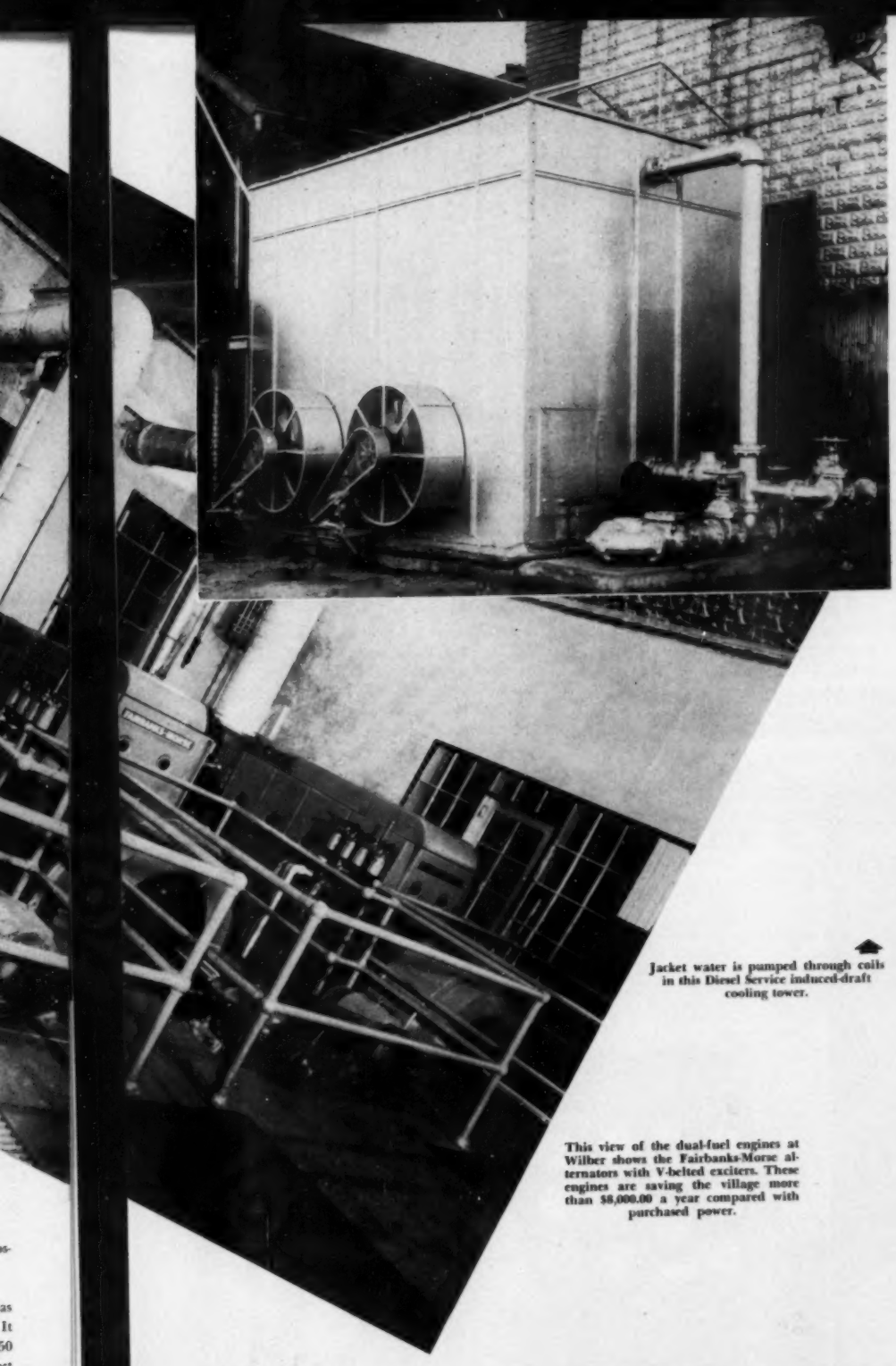
This Small Nebraska Town Is Colorful, Chuck Full of Business Enterprise, and Has the First New 100 Per Cent Dual-Fuel Power Plant in the State

By HENRY J. BARBOUR

"THE town of Wilber, Nebraska," the man said, leaning back in his swivel chair, "may have less than 1500 population but it has a lot of character." I made a note of the population figure and looked at him questioningly. "Yes, ever since they stole their first county courthouse," he went on, "Wilber has had just a little extra flavor. Of course, everyone in this part of the country eats Wilber weiners and the fortunate ones have experienced the warm conviviality of the town." (It developed that this sober gentleman once had been entertained at a semi-official Wilber function and had never forgotten the night or morning after.)

"About stealing that courthouse—" I prompted. "Oh yes. That was back in the town's early days when the county offices were in a neighboring community. Most of the county officials and employees, though, preferred to live in Wilber, so one dark night they hitched up a couple of horses, loaded all the county records and moved the county seat to Wilber. There was quite a yowl from the bereaved town but the county seat has remained in Wilber ever since. As a matter of fact, you'll find them quite proud right now of their new $250,000.00 county courthouse, not to mention their new $100,000.00 school. But if I were you," he said sternly, "in sampling Wilber hospitality, I would stick to the weiners."

As a matter of fact, my interest in Wilber was neither weiners nor courthouses, stolen or not. It seems that this progressive small town (the 1950 census said 1455 population) has one of the most modern power systems in the state. In fact, it has the first new 100 per cent dual fuel power plant in Nebraska. This new plant, put into operation in May 1950, features three Fairbanks-Morse Model 31AD8½ dual-fuel engines, one rated at 455 hp. and two at 325 hp. It was in 1891 that Wilber got



Jacket water is pumped through coils in this Diesel Service induced-draft cooling tower.

This view of the dual-fuel engines at Wilber shows the Fairbanks-Morse alternators with V-belted exciters. These engines are saving the village more than $8,000.00 a year compared with purchased power.

its first electric service from a private company organized by local residents. In 1900, the community voted to erect its own municipal power plant, a steam plant which was put into operation in 1901 and enlarged in 1905 and 1913. The plant was abandoned in 1920 in favor of power purchased from a small hydro utility company but the village retained the distribution system.

The load grew and the service deteriorated. Voltage wavered and often voltage drop was sufficient to dim the lights and cause motors to overheat. For this inferior service, the village paid a bulk rate of 2 cents a kw. hr. during peak period, 1½ cents for day load, and 1 cent for off-peak power, a combination rate which averaged 1½ cents for all power purchased. In addition, the village had to keep a man at the plant to handle distribution at the switchboard. Finally it was decided to meet the problems of poor service and high cost with the installation of a new municipal power system.

The old distribution system was completely rebuilt. Ultra-modern mercury-vapor street lights were installed with underground cables to serve them. The old building which housed the steam plant was remodeled to accommodate the three dual-fuel engines and all accessory equipment. The engines chosen are trim enbloc units which operate on the efficient Diesel cycles but burn economical natural gas with a small quantity of oil as pilot fuel. In the event of gas supply failure, the units switch automatically to oil. These 2-cycle Fairbanks-Morse engines have 8½-in. bore, 11-in. stroke and developed rated horsepower at 514 rpm. The seven-cylinder unit, rated at 455 hp., drives a 310-kw. 2400-volt Fairbanks-Morse alternator. The two five-cylinder, 325-hp. engines drive 220-kw. F-M alternators.

The engines are served by a full complement of modern accessory equipment. The 36 gravity pilot oil is unloaded from tank cars by a motor-driven rotary pump into two 12,000-gal. storage tanks, then flows by gravity through meters to three 200-gal. day tanks. The engines' own supply pumps pick up the fuel at the day tanks and send it through filters to the injection pumps. Gas comes in at 40 lb., is metered and regulated and finally reaches the engines at 18 lb. The full pressure lubricating system includes a strainer, filter and oil cooler for each engine. The three-cartridge fuller's earth filters are arranged to take a portion of the oil from the pressure side of the main lube circulating pumps. There is also a batch purifier for use as necessary. Thus far the filters have kept the oil in excellent condition and no further treatment has been necessary. An automatic thermostatic control keeps oil at the proper temperature.

Two 300 gpm. motor-driven centrifugal pumps put soft water through the engine jackets and through the coils in a new 800-hp. induced-draft cooling tower. City water, treated in a softener, is used for makeup. Another pair of motor-driven centrifugals take raw water from the power basin and put it through the oil coolers and the tower sprays. Thermostatic controls by-pass water around the sprays to keep jacket temperature at the prescribed level. There is also a pair of motor-driven turbine pumps to circulate raw water in emergency. Intake air for the pump-scavenging engines comes through filters and silencers. Exhaust gases pass through vertical silencers to the rear of the plant. Starting air is provided by a pair of compressors, one driven by an automatically-controlled motor, the other by a small gasoline engine.

There is a big gauge and alarm board with a panel for each engine. Each panel holds an exhaust pyrometer, alarms on jacket water tem-

perature and gas, lube and water pressure. Also on the board are control switches for water pumps and cooling tower fans. The new switchboard has three engine panels, four feeder panels, a synchronizer panel and a voltage control panel. Instrumentation is particularly complete. Though the plant has only a brief operating record, it already has demonstrated its capacity to fulfill Wilber's objectives. Service is the best the village ever has known. Engine efficiency is such that the village is saving at the rate of more than $8,000.00 a year as compared with the cost of purchased power. This takes into consideration all plant costs including interest and depreciation. In the first five months, the engines generated 610,290 kw. hr. and burned 7816 MCF of natural gas and 7990 gal. of pilot oil. Average fuel cost was just 4.1 mills per kw. hr. This has been achieved with fuel oil costing from 9.6 to 11 cents a gallon and gas ranging from 21 to 23.4 cents per MCF. The table gives the monthly figures on engine hours, generation, peak loads and fuel and lube consumption.

The same labor force needed during the purchased power regime is adequate to operate the plant and this is an important factor in the savings achieved. The small town plant always has to contend with high unit overhead, but Wilber is making substantial profits at present production levels and consequently anticipates even greater economy and profits as the load grows. At present there are 700 customers including suburban and farm users. Consumption per residence is increasing as more appliances are put to use. There is an increasing number of electric stoves. The load is nicely balanced, with the weiner factories grain elevators and commercial use just about equal to the residential consumption. The present plant is large enough to handle considerable load expansion. Peaks run to 430 kw., requiring operation of two engines for a short period, but through most of the 24 hours, one unit is sufficient. Usually the big engine runs from 7:30 a.m. to 10 p.m. and one of the smaller units carries the night load.

This is a closely-knit, active community and Mayor Irvin Beck and Councilmen John Fritz, Ed Hawser. Vance Jelinek and Fred Aksamit are in close touch with the work carried on by Superintendent of Utilities Leo Wait and his staff. Mr. Aksamit is chairman of the council's Light and Water Section. Also active in the affairs of the department are City Clerk Louis Kusy and City Attorney Clarence C. Kunc.

MONTHLY FIGURES ON ENGINE HOURS, GENERATION, PEAK LOADS, FUEL AND LUBE CONSUMPTION

1950	Kw. Hrs.	Fuel Oil	Gas, MCF	Engine Hours No. 1	No. 2	No. 3	Lube	Peak Load
May	97,890	1,500	1,480	302	163	162	87	420
June	122,580	1,290	1,566	390	77	284	112	400
July	129,210	1,900	1,604	369	301	113	112	390
Aug.	129,360	1,020	1,570	358	83	351	135	430
Sept.	131,300	1,620	1,596	380	88	313	135	400
Totals	610,290	7,990	7,816	1,808	712	1,223	581	430

Principal Equipment

Engines: Three 2-cycle, 8½-in. bore and 11-in. stroke, Model 31AD8½, dual-fuel engines developing rated horsepower at 514 rpm. Fairbanks, Morse & Co.

Alternators: Fairbanks, Morse & Co. The 455-hp. engine drives a 310-kw. 2400 volt alternator. The two 325 hp. engines drive 220-kw. 2400 volt alternators.

Governors: Woodward Governor Co.

Levelometers: Liquidometer Corp.

Fuel Meters: Buffalo-Niagara.

Fuel Filters: Purolator Products, Inc.

Lube Oil: Vacme #3. Socony-Vacuum Co.

Lube Strainers: Cuno Engineering Co.

Lube Oil Coolers: Ross Heater & Mfg. Co., Inc.

Lube Purifiers: Renuoil. Diesel Service Co.

Thermostatic Control: Powers Regulator Co.

Jacket Water Pumps: Two 300 gpm. pumps. Fairbanks, Morse & Co.

Cooling Tower: Diesel Service Co.

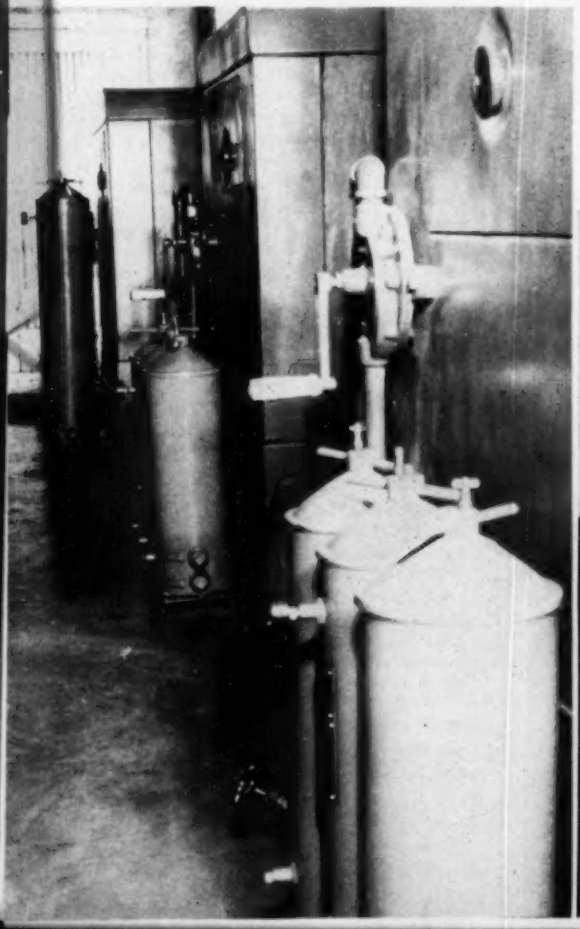
Air Filters: American Air Filter Co., Inc.

Intake Silencers: Maxim Silencer Co.

Exhaust Silencers: Maxim Silencer Co.

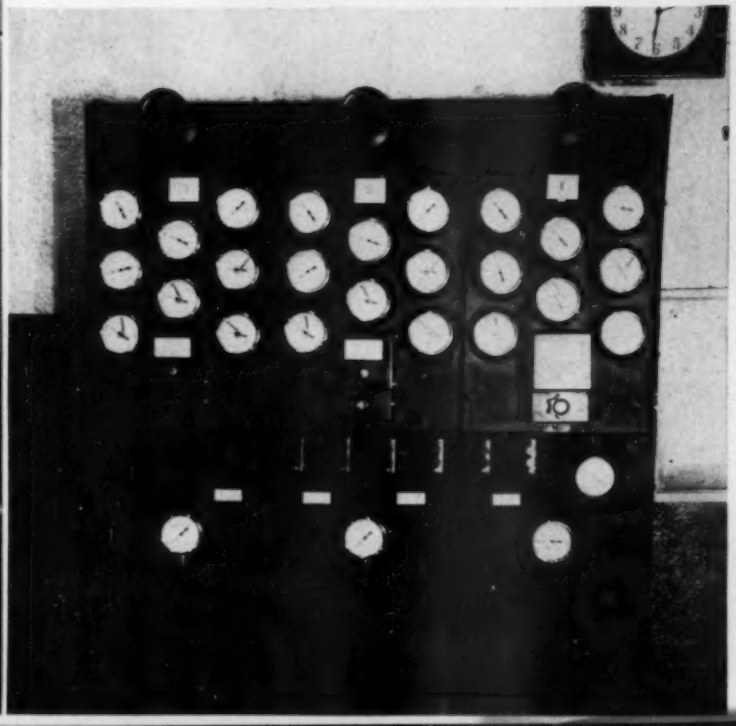
Pyrometers: Alnor. Illinois Testing Laboratories.

Switchboard: General Electric Co.



Lubricating oil for each engine is cleaned continuously by three-element fuller's earth cartridge-type Fairbanks-Morse filters.

A central gauge and alarm panel holds for each engine an Alnor Exhaust pyrometer, Marshalltown pressure and temperature gauges and an Edwards alarm. Below are control switches for auxiliary equipment.



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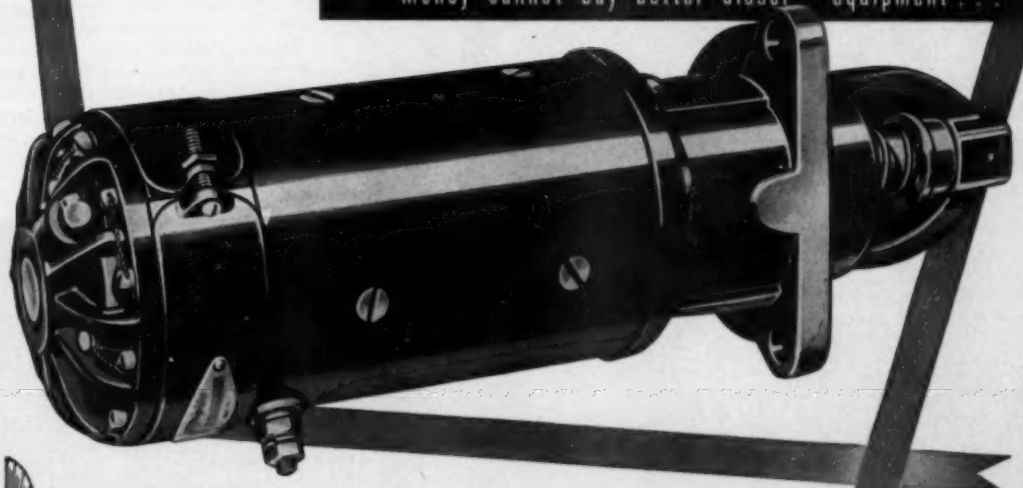
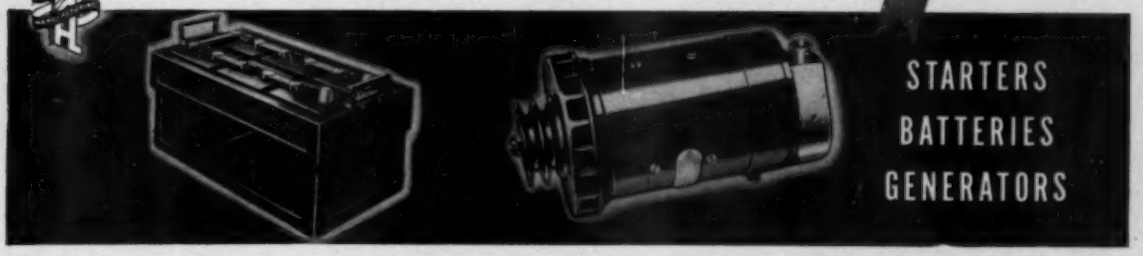
Money cannot buy better diesel equipment . . .



Tune in "Suspense!"— CBS Television Tuesdays



STARTERS
BATTERIES
GENERATORS

CLEARING FOR HUNGRY HORSE

Highball Timber Clearing System Combined With Diesel Tractors Save $2,000,000 Plus One Year in Time

By HUGH G. JARMAN

THE economical operation of a fleet of huge diesel tractors plus a revolutionary "highball" clearing method, enabled contractors Wixon & Crowe Inc. and J. H. Trisdale Inc. to take contracts at a bid $2,000,000 lower than that of their competitors and also enabled them to save nearly one year in time on the contracts, which will now assure the U. S. Bureau of Reclamation time to permit the storage of 1,000,000 acre-feet of water in the Hungry Horse reservoir during the spring runoff of 1952. This storage is essential to spin the first two generators which are scheduled to begin producing power in October and December 1952, to help relieve acute power shortage conditions in the Pacific Northwest.

As a result of the amazing speed of the diesel tractor "highball" combination clearing method, the entire clearing job probably will be completed by late 1952, more than one year ahead of schedule. Product of the imagination and engineering know-how of the two-major clearing contractors working in the big Bureau of Reclamation reservoir, the "highball" clearing scheme utilizes huge 4½ ton steel balls pulled with steel cables behind teams of powerful diesel tractors. The name "highball" describes the new clearing method particularly well, not only because of the large balls, but because this new mechanized scheme clears limbered land at a rate rivaling the legendary feats of Paul Bunyan.

The men who developed the revolutionary clearing method and are using it to snag down the timber on the steep mountain slopes and valley floor of the Flathead River's South Fork are S. L. "Red" Wixon of Wixon & Crowe, Inc., and John Trisdale of J. H. Trisdale, Inc., both of Redding, California. Basically, the "highball" clearing idea is a refinement on a very effective mechanized clearing method developed and used in 1949 by the two contractors, in which pairs of powerful diesel tractors are used to drag up to 400 feet of 2-inch wire cable through the timbered areas, snagging down all of the trees, snags and brush caught in the loop of the cable. Working largely in burned over areas in 1949, the contractors found the cable snagging method so efficient that they were able to complete about 95% of their joint contract for clearing 7,210 acres of land. However, land being cleared under new contracts awarded in January 1950—6,840 to Wixon and Crowe, and 7,855 acres to Trisdale—is largely in logged over areas. Merchantable timber in the reservoir area is being logged and cut

into ties and lumber. Wixon and Trisdale came to realize that their cables would hang up on the stumps left by the loggers. It was here that they came up with their new idea of using the 8-foot diameter steel balls to keep the cable high enough above the ground to prevent snagging on stumps.

The 8-foot diameter steel balls are constructed of ¾" boilerplate steel, and each ball has a 6-inch diameter steel shaft mounted in timken roller bearings. Eight to ten gallons of oil are kept in the ball to lubricate the bearings. Five of these balls were made for the experiments. The balls were fabricated in the Redding, California shops of Wixon & Crowe Inc. and J. H. Trisdale Inc. and then trucked to the reservoir area on the South Fork of the Flathead River in northwestern Montana.

Since this was an entirely new idea in land clearing operations, the contractors experimented with several methods of using the balls in pairs and singly. As a result of these experiments, it was determined that the fastest and most efficient set-up consisted of one ball pulled by a pair of heavy duty diesel tractors. In operation, the contractors are using approximately 200 feet of 1½ inch wire rope on each side of the ball. The winch cables (1¼") from the two tractors, are attached to the ends of the ball cable with swivels and jewels to prevent twisting and tangling of the cables. The amount of winch cable used varies on the type of equipment, for instance at the present time, Trisdale is using 100 feet of cable on standard Hyster winches mounted on D-8 Caterpillar tractors, Wixon is using up to 900 feet of 1¼ inch cable on each of the two special Carco winches mounted on two Allis-Chalmers HD-19 tractors. The additional length of cable that can be used with the Carco winches increases the flexibility and efficiency on the snagging operation.

In making a "pull" the two tractor operators bulldoze their way through the timber on approximately parallel paths several hundred feet apart. The distance between the tractors varies with the type of terrain and the size of the trees to be snagged down. In light going the tractors move through the timber snagging down trees caught in the loop of cable as they progress. However, in heavy stands of fairly large diameter trees, the value of the winches becomes apparent. The tractor operators permit the cable to unreel as they move ahead through the timber until they have played out most of the cable on the winches. They then anchor the tractors against trees or stumps and reel in the cable on the winches. The tremendous increase in pull gained by using the winches in this manner makes it possible to pull down trees up to four feet in diameter.

As the cable and ball crash through the timber as fast as a man can walk, all of the trees caught in the loop of cable are uprooted and felled as though they had been struck by a terrific hurricane. In addition to the almost unbelievable speed achieved, the "highball" clearing method also is much safer than standard clearing methods. By using their winches properly, the tractor operators are always well clear of the area in which the trees are falling. The "highball" method uproots practically all of the large trees. Dead snags and some of the trees snap off like match sticks when struck by the cable. Small trees are frequently only partially uprooted or are bent over without breaking. However, in bending the small trees, the cable scrapes the bark from one side of the trees. As a result, these small trees bleed and die quickly, turning brittle so they are easy to stack and burn.

After the timber is snagged down, teams of tractors with bulldozer brush blades move in to stack the trees and brush for burning. The contractors are using the Paul Bunyan bowling balls on all types of terrain from flat land to hillsides so steep it seems impossible to work a tractor on them.

WHAT'S GOING ON IN ENGLAND

CONDUCTED BY **HAMISH FERGUSON**

Hamish Ferguson was appointed Secretary to the Diesel Engine Users Association in London in 1944. Previously senior technical assistant to Diesel and Insurance Consultants, London, and for several years with English Electric Company in the designing and erection of large diesel generating plants. Mr Ferguson continues to do independent consulting work.

BRITISH Railways have been making extensive trials with diesel locomotives for passenger, freight and shunting duties, three main line units and over a hundred shunting units being in operation at the present time. Most of these locomotives have electric motor traction. Electric transmission has for so long been associated with diesel traction for railways that it is almost universally accepted as being necessary, in order to enable the constant torque diesel engine to provide the range of torque and speed which is required for railway traffic operation.

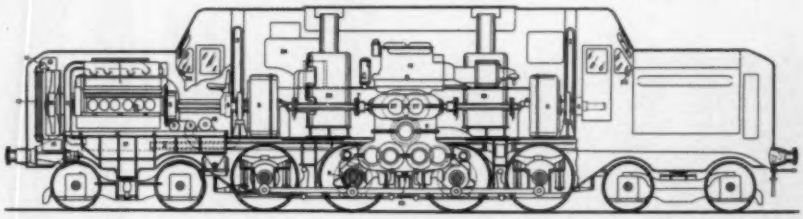
Because of high initial first cost and the transmission losses involved, attempts have been made in the past to replace the electrical equipment by other forms of transmission, notably by means of hydraulic torque converters, air pressure systems and mechanical gear boxes, but difficulty and unsatisfactory performance have been experienced when dealing with high powers as required for large main line locomotives.

A diesel locomotive, designed to overcome the difficulties experienced when the electrical transmission is dispensed with, has recently been completed at the Derby locomotive works of the London Midland Region of British Railways. Built on the "Fell" system, it has eight coupled driving wheels and a four wheeled bogie at each end, the wheel arrangement being therefore of the 4-8-4 type. Duplicated driving cab arrangements, similar to those on the main line diesel locomotives already in service on British Railways are provided.

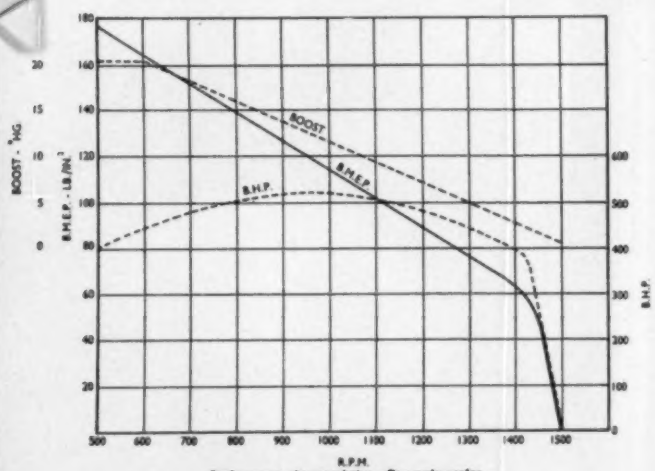
The motive power of the new locomotive consists of four Davey Paxman 12 cylinder diesel engines developing 500 h.p. each and in order that these main engines should have their full torque available for traction, two additional auxiliary A.E.C. diesel engines provide the power for driving separate supercharging blowers, and all auxiliaries such as radiator fans, vacuum exhausters, water circulating pumps, etc. Starting of the main engines is by starter motors driven from 24 volt batteries.

By supercharging by separately driven blowers, the diesel engines can be made to provide a wide torque variation over their speed, the blower capacity being sufficient to supply air to maintain the full rated power, resulting in an almost flat horsepower curve over the complete range of speeds.

The four main engines are situated in pairs at the outer ends of the locomotive. Each drives the input side of a Vulcan Sinclair size 36 scoop type fluid coupling, through Bibby spring couplings on the ends of the crankshafts. The fluid couplings are mounted on separate bearings carried on pedestals from the main frame stretchers.



Layout of a propotype locomotive with the Fell diesel mechanical drive.



Performance characteristics – One main engine

Performance characteristics of the 2,000 hp. mainline locomotive with mechanical transmission.

While the supercharging of the engines can give a wide variation of torque, the speed range must be further extended by other means if the performance and flexibility of the steam engine is to be approached. In this new locomotive this aim is achieved by the incorporation into the drive of a gearbox.

From the output side of the fluid couplings, shafts drive through Layrub couplings into the four top corners of the gearbox which is flexibly mounted on Metalastik bonded rubber bearings on the longitudinal centre line of the frames. In the top sec-

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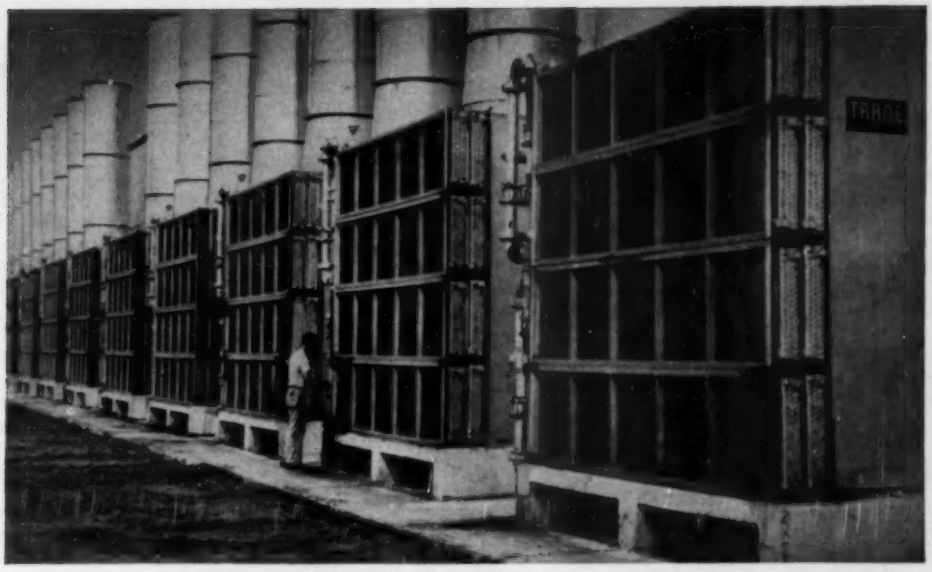

74 More Engine Coolers for Alcoa

For more efficient engine cooling, for more aluminum production, the Aluminum Company of America has again called on Trane Dry Type Fluid Coolers. Now *almost 200* of these units will cool lube oil and jacket water of the big radial engines at Alcoa's reduction plant in Texas.

Almost 200 giant Trane Fluid Coolers will provide complete engine cooling efficiency without using water and requiring only a minimum of power!

These units can cut gas or diesel engine cooling costs to the quick. With flat plate-type fins and round tubes, the core of the unit offers less resistance to the air flow, so the unit needs less horsepower to do its cooling job. Heat transfer is faster and more efficient, too. That's because the fins are mechanically (and permanently) bonded to the tubes, and because the fin collars form a continuous sheath around the tubes.

A wide variety of standard core headerings are available, so the Trane Fluid Cooler can provide just the circulation and heat transfer rate desired.

There's no water to treat or sediment to remove with Trane dry type fluid cooling. Core headers and tubes are easy to reach and clean, and the fan motor is conveniently placed.

Ruggedly built, these units can take the strains and shocks of mobile and outdoor installations without extra bracing.

The units are available in horizontal air stream models, in 14 sizes with fan diameters of 18" to 120" and vertical air flow models in 8 sizes with fan diameters from 72" to 144". Trane Fluid Coolers have steel casings, aluminum fans, copper or aluminum tubes and aluminum fins. The units can also be furnished in other materials and constructions.

Capacities range from 66,000 to 7,600,000 Btu per hour.

Rugged casing and motor support construction of horizontal air stream model.

Trane GC Fluid Cooler. Air flows upward through core, unaffected by wind direction.

Horizontal air flow Fluid Cooler, available in 14 sizes, either blow-through or draw-through fan.

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DIESEL SHOVELS DAM RIVER

By DWIGHT P. ROBISON

IT'S Diesels vs. Demon up in the rugged regions of west central Idaho where dieselized bulldozers, scrapers, motor graders, shovels and compressors are constructing Lucky Peak Dam in order to pull the teeth of the Boise River. First development of the Boise River valley for irrigation came with the construction by the Bureau of Reclamation of Arrowrock Dam in 1915. Later Anderson Ranch Dam was built, chiefly for irrigation, but having 212,000 acre-feet of storage allotted for flood control. This capacity, alone, is insufficient to provide satisfactory control when the Boise—fed by the runoff from a drainage area of approximately 2,600 square miles—sets itself for a real rampage. Thus the Corps of Engineers' Lucky Peak project, 10 miles east of Boise.

Firstly Lucky Peak is being built to halt floods and their terrible effects. Secondly, the design of the dam makes it an integral part of a multiple basin plan by joint agreement between the Corps of Engineers and the Bureau of Reclamation. This means that the new dam, when completed, can store water for irrigation and harness the flow to provide electric power, as well as to protect against flood ravage. To build Lucky Peak's earth and rock structure, man and his machines will move an estimated 6,000,000 cubic yards of material, blasted and excavated from the face of the earth. The dam will have a base width approximately a quarter-mile wide, tapering upward 328 feet to a top width of 30 feet at the 2,200-foot-long crest. The reservoir will store 300,000 acre-feet of water at maximum pool, 3,078 feet above mean sea level, and water will be backed up the canyon of the Boise 13 miles, normally inundating the lower face of Arrowrock Dam to a 100-foot depth.

Work on Lucky Peak began November 30, 1949. The first job involved pushing a 23-foot steel-lined diversion tunnel through almost solid rock. This tunnel, which broke through to daylight July 15, 1950, is 1,161 feet long and will have a diversion capacity of 30,500 cubic feet of water per second. It will eventually become the normal channel for the average flow of water past the dam. Other work at the dam site throughout the spring, summer and fall of 1950 was spread over an area of several miles and included building of two cofferdams, excavation of the core trench, installation of a drainage system to protect the work area from underground seepage, and relocation of Idaho State Highway 21, to bring the roadway high enough on the canyon wall to by-pass the future reservoir. In all, the relocating process involves 31.3 miles of state, county and farm roads and 20.5 miles of telephone and power lines at a cost of $6,000,000.

The core trench, running the length of the base is being dug to a depth of 78 feet below the river base. It will contain the impervious clay core of the structure. Upstream and downstream slopes of the dam are to be covered by laminated layers of gravel with an outer covering of rock riprap. Lucky Peak is scheduled for completion in September, 1953. When this structure is completed it will take its proud place with the many man-made barriers that diesels have helped to build.

Overall view of the road relocation on the Lucky Peak Dam project near Boise, Idaho. Morrison-Knudsen, Tertcling, Macco, Puget Sound Construction Company is the general contractor. A great deal of diesel equipment is in use on this huge project.

Entrance to diversion tunnel on up-stream side of Lucky Peak Dam project, 70 miles east of Boise, Idaho.

The Eimco loader is a handy tool in close quarters as in this instance where it is mucking out for the diversion tunnel illustrated above. The Eimco rocker shovel is mounted on a Caterpillar diesel D4 tractor.

Exchange Your Diesel Maintenance Ideas

CONDUCTED BY R. L. GREGORY

MAINTENANCE OF PLANT ELECTRICAL EQUIPMENT

Part 1 — Commutators and Brushes

By HENRY J. GREINER*

ONE of the most particular maintenance programs around a power plant is that which covers the care and maintenance of electrical equipment. There is such an abundance and at the same time a great variance in the types of electrical equipment required for plant operation in all modern plants, and the satisfactory operation of all electrical equipment is so vital, that it would be impossible to discuss in one article, all the phases of electrical maintenance. We have therefore decided to cover this subject in a series of articles, of which this is part one.

We recently received a communication from Mr. Henry J. Greiner of Elk River, Minn., wherein he gave his views and theories on the "Care and Maintenance of Commutators and Brushes" and with this as a basis we will endeavor to cover the subject, aided and abetted by comments from the writer, in this first article. Mr. Greiner states:

For satisfactory operation and commutation on any dc. unit or the commutator types of ac. units, the prime factor to be noted is that of keeping the commutator and brushes in proper condition. A great majority of commutation troubles can be traced directly to excessive sparking of the brushes, although there are many other causes which contribute to poor commutation.

Sparking at the brushes is expensive and detrimental, chiefly because it results in the burning of the brushes as well as the commutator segments, necessitating frequent maintenance or renewal of the brushes and frequent commutator maintenance unless the causes of sparking can be located and eliminated. Every spark consumes a small particle of the brushes or minute particles of copper burned from the commutator segments, and the longer the sparking continues, the greater the evil becomes, and remedy should be applied without delay.

There are essentially three types of sparking, each easily recognized by one familiar with commutation. The first type is that which is due to bad brushes or brush adjustment, and can be recognized by the bluish color of the sparking. The sparks in this instance are small when the brushes are set near the neutral point, but they increase in violence and brilliancy, as the rocker arm or brush rigging is moved, thus moving the brushes away from the neutral point. This sparking can generally be overcome by cleaning and refitting the brushes to the commutator, and by correcting the brush setting with relation to the neutral point.

The second type of sparking is that produced by a dirty or faulty commutator, and is recognized by the reddish color of the sparks, which is usually accompanied by a sputtering or hissing sound. This type of sparking cannot be eliminated except by cleaning the commutator and doing a good job of maintenance in placing the commutator back in proper operating condition, which will be discussed later on.

The third type of sparking, somewhat similiar to the first, is that caused by some defect in the armature itself or in the commutator, such as a broken connection in the winding, grounding of the wiring or commutator segments, shorts between windings or bars, or loose connections. The cause of this type of sparking can generally be determined from that caused by brush trouble, by gently moving the brush rigging forward and backward, thus allowing the brushes to recede or approach the neutral point. If the sparking does not decrease in violence as it approaches the neutral point, you can be reasonably assured that the sparking is due to some other defect than brush trouble.

Having distinguished between these three types of sparking, it remains to enumerate the causes which produce them and how to correct the difficulties. These causes are: 1. Faulty condition of the brushes themselves. 2. Faulty adjustment with regards to the brush setting and the neutral point. 3. Faulty condition of the commutator. 4. Breaks in the armature windings. 5. Short circuits and grounds in the armature or commutator. 6. Loose connections. 7. Overloads.

Faulty condition of the brushes. When sparking is caused by either faulty brushes or brush adjustment it can generally be detected as this cause by shifting the brush rigging rocker on the commutator, since the condition of sparking will vary with varying brush conditions and positions in relation to the neutral point. It is always best to use the type of brush recommended by the manufacturer of the unit, since they are familiar with the grade of brush best adaptable to proper commutation. Substitutes of any other grade may in many instances lead to trouble. Brushes with frayed or uneven ends should be trimmed. All brushes and brush holders should be cleaned thoroughly to remove excessive dirt, oil or carbon.

After this has been accomplished, and provided the commutator is in good condition, proceed as follows. First take a strip of clean wrapping paper, the width of the commutator and long enough to go completely around it and fasten it tightly to the commutator. Then place the brushes in their respective holders and with a lead pencil, mark the brush tips in each set of holders. After this has been completed, gently remove the strip of wrapping paper and measure the distance between each set of marks. This distance should be uniform between all sets of brushes. In so doing, if a variance is found between sets, the brush holders should be readjusted on the rocker arm to give proper spacing between brush sets.

Of course the foregoing assumes that you have trimmed the brush ends and fitted them properly to the commutator so at least three quarteres of the brush is making perfect contact with the commutator face. Full contact is even better but with three quarters contact from the brush tip back toward the heel will give satisfactory results and the balance of the brush will soon assume full contact.

Now as to the correct adjustment of the brush rigging with respect to the neutral point. In all well designed units there is a certain position of the brush setting on the commutator where no sparking will occur, providing all conditions are right. These conditions mean that the commutator must be clean, true in operation, have no defects such as shorts, grounds, broken or loose connections, with brushes properly fitted and proper spring tension on each brush. This position of the brush rigging is at or very close to the neutral point and generally is plainly marked on the unit. If not, and the conditions as above mentioned are proper,

Superintendent of Maintenance, Rural Cooperative Power Association, Elk River, Minn.

it should be easy to locate by gently moving the brush rigging with the rocker arm, back and forth over the commutator, until no sparking occurs. When this neutral position is finally determined, the rocker arm should be clamped in position, usually by means of a set-screw which is provided for that purpose.

Faulty condition of the Commutator. This includes a multitude of sins, primarily, out of round, burned and uneven segments, high segments, high mica insulation between segments and even the rough condition and ridging often noted on commutators due to lack of proper care and maintenance. When any of the above conditions are noted one should proceed as follows: First remove the armature from the unit, whether a motor, exciter, motor generator set, etc. Place the armature in a lathe, properly centered and then turn the commutator by taking several light cuts with a fine point, sharp tool. Never use a broad tool as it has the tendency to tear the copper segments. When the commutator has been finished and trued up, the mica insulation between segments should be undercut, using the conventional type of undercutting tool or another convenient tool for this purpose is a jeweler's hacksaw. The depth of this undercutting depends on the commutator size.

When this insulation has been undercut, replace the armature in the lathe, take a very fine finish cut and then polish it well with a piece of good canvas. Upon completion of this work, the commutator should be thoroughly inspected and blown out to remove any excess dirt or cuttings, being sure that no bits of metal are left bridged from one segment to another. It is always well to then test for grounds, shorts, broken wires, etc. by use of the conventional "growler." One can make this growler test before turning the commutator down, but this is sometimes misleading, especially where one is repairing a burned commutator, that is where adjoining segments have been burned. In such a condition one might find burned particles bridging the segments, thus showing a short between adjoining segments, which in all probability will disappear with the turning down of the commutator.

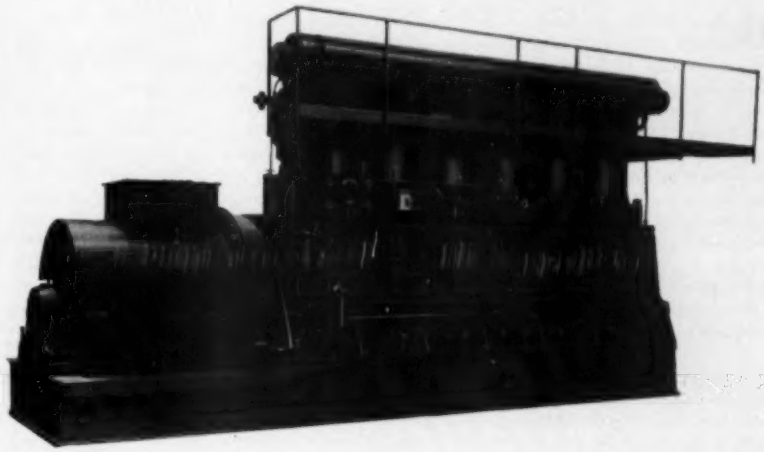
One other factor should be inspected in the matter of reconditioning any commutator. The connection of the armature winding to each respective commutator segment should be well noted. Oftimes when a commutator is operated with defects for any lengh of time, it heats up and these connections which are usually soldered may become loose. This should be thoroughly checked and if any loose connections are noted, they should be repaired by resoldering. In some instances these connections are silver soldered, particularly in larger units.

There is one exception to the above method of turning down and trueing up commutators which should be noted in this article and while it does not directly effect many units in diesel plants, there are some plants where steam turbines are used in the system along with diesels, such as our own. In this case most of the turbines are high speed units, standard speed being approximately 3600 rpm. In most instances these turbines have direct connected exciters, the armature of the exciter being mounted on an extension of the generator shaft, the stator being mounted on an outboard pedestal. This armature is usually fitted to a taper bore, and unless one is fitted with a proper mandral to press the armature on when placing it in a lathe, it is pretty difficult to center it truly in the lathe, and get a perfectly running commutator, when turned down. To overcome this condition, the proper method of turning the commutator is to leave the exciter armature intact on its own shaft, remove the exciter stator from the pedestal and mount a turning tool on the pedestal. Then operate the turbine at one third to one half speed and turn the commutator in place. With this method the resultant trued up commutator will run true when the unit is up to full speed.

Space will not permit further discussion on this subject, but it will be continued in the next edition of DIESEL PROGRESS.

California Hilliard-Hilco Representative

The Hilliard Corporation announces the appointment of Guy T. Martin & Company, 642 East Olive Street, Gardena, California as their representatives in California to distribute their entire line of Hilco lubricating, fuel and industrial oil purification equipment. Guy T. Martin & Company have come to Hilliard with many years of active service to the industrial field in California and with this new appointment, Hilliard will have representation along the entire West Coast.



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Supervising & Operating Engineers Section

CONDUCTED BY R. L. GREGORY

A Matter Of Importance To Our Readers

ONE of the main functions of this section of DIESEL PROGRESS is supplying our readers with information which is of vital import to Supervising personnel, whenever and wherever possible. No doubt many of you are affiliated with the American Public Power Assn., and are recipients of that Association's weekly news letter. However, your writer feels that the majority of our readers are not aware of a situation which was presented in the weekly news letter of May 28th and therefore we feel that it should be brought to your attention at this time, as it is still not too late for you to act upon the matter. I have before me a copy of the above mentioned letter and am quoting from it as follows:

"The enclosed copy of our weekly Newsletter contains information on one of the most vital issues which has come before municipal utilities in many years—a decision of the House Ways and Means Committee to impose a 3⅓ percent tax on energy sold by publicly owned electric systems to residential and commercial customers.

"The House Ways and Means Committee Tuesday (May 2nd) threw a bombshell into the laps of officials of public systems. It voted 18 to 7, to extend the base of the 3⅓ percent electrical energy tax 'to include sales by Government owned plants.' It agreed, however, to continue the exemption of the REA financed electric cooperatives. Whether 'Government owned' includes the Federal Government is not clear at this writing, but there is no doubt that it means state, county and city owned projects as well as public power and public utility districts. We are alerting our members at once, and will seek the active assistance of all other groups who may be affected by the precedent for taxation which would be set by the passage of this bill.

"The Ways and Means Committee will probably report on the 1951 Tax Bill around the middle of June. It will come to the floor under a 'Closed Rule" which prevents any amendments on the floor. All that can be done right now is to press for reconsideration by the committee on the question of the electrical energy tax. A member who voted FOR the tax must initiate the request for reconsideration. We are now pressing for reconsideration, but the size of the 'YEA' vote makes success doubtful. Our only hope then is in the Senate.

"Position in the Senate—After the House passes the bill, it will go to the Senate for hearings before the Senate Finance Committee. We will have a crack at it there, and also on the Senate floor, since the 'Closed rule' is not applied on the Senate side. There is talk here (in Washington) of a recess on August 1st, with Congress convening again on October 1st. It is possible that hearings may take place in July or perhaps during the recess, with final Senate committee action this fall. In any event, everyone concerned is agreed that this is a most serious matter, and that we should do everything possible to prevent this proposal from becoming law. All possible cooperation should be worked out between local and state groups who would be directly affected, as well as those, such as various State Municipal Leagues, who would be seriously hurt by the precedent established. This is a more damaging proposal than a tax on bond interest, because this is a direct tax on the gross receipts of a public utility. If it is sustained, it is obvious that the next step is an income tax on publicly owned systems.

"While some may contend that it is unpatriotic to oppose a tax under today's international conditions, it should be emphasized that what is at stake is far more than a 3⅓ percent tax, which obviously would be passed right down to the consumers. At stake here is the continued sovereignty of state and local governments, and the reciprocal tax immunity which has existed between the states and the Federal government from the very beginning. Under the pressure of defense spending, it is being proposed that the historical immunity from Federal taxation of state and political subdivisions be cast aside. If this happens, state and local officials might as well consider our two-level system of government—state and local on one hand and Federal on the other—at an end.

"Details of Tax—Our exemption is now found in the Internal Revenue Code, Section 3411 (c). If public systems are made subject to the tax, they would be required to file a return monthly with the Collector of Internal Revenue and pay 3⅓ percent of their gross receipts for power and energy sold to the domestic and commercial consumers. Industrial sales are exempt, and where there are mixed activities, the matter is worked out with the Collector. Most of the private facilities which now pay the tax include it in their rates. Only a very few list it on the bill as a surcharge."

Commenting on the foregoing letter, a subsequent letter under date of May 28th, had this to say concerning this proposed tax: "Such a tax would strike a serious blow at the finances of publicly owned electric systems, since the publicly owned utilities are non-profit and operate with little margin to absorb such a tax. Equally important, this provision would be a serious infringement upon the division of powers between the Federal government and the State and local governments, as provided in the Constitution. We must therefore fight this tax proposal as vigorously as possible.

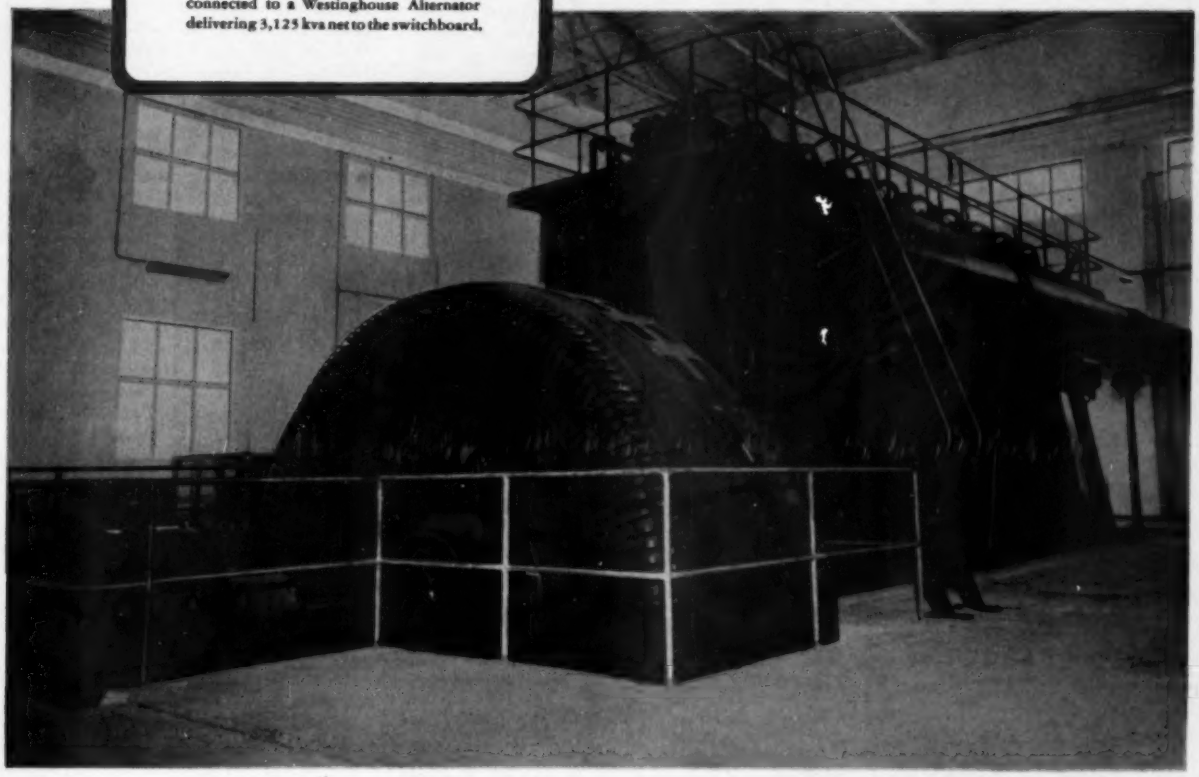
"The one and only organization which represents the municipal owned utilities—and is therefore the logical leader in this fight—is the AMERICAN PUBLIC POWER ASSN. Although the APPA now represents over 700 local publicly owned electric utilities, we still lack in our membership a number of important utilities.

"It is significant to note that the House Ways and Means Committee exempted the rural electric cooperatives from this tax, even though the municipally owned utilities have a much stronger case for exemption, on constitutional grounds, than the co-ops. Undoubtedly, one of the reasons for the exemption of the co-ops was the fact that they have a strong national organization which is representative of practically every rural co-op in the country. There is no reason why the municipal and other public systems cannot be equally well organized."

Just a few comments on the above situation. We of the municipal owned and operated plants, can readily see the danger which exists in the passage of such a tax bill. With our endeavors to produce electrical energy to our customers at rates within their ability to pay, in face of increasing fuel, labor and maintenance parts costs, we certainly have expense problems enough without the burden of such additional taxation, especially where rural co-ops, as competitors in many instances are exempt. Most of the rural co-ops are diesel operated, and we do not want our readers to feel that we envy them this exemption, because such is not the case. However, we do feel that when it comes to taxing electrical energy sales of government owned plants ,either state, county or municipal, and allowing exemption of competitive plants, that there is certainly evidence of discrimination which

. . . and now please turn to page 68 . . .

This is the first American-made engine generator unit installed at the powerplant of the Bermuda Electric Light Co., Ltd. The Nordberg Diesel Engine is direct-connected to a Westinghouse Alternator delivering 3,125 kva net to the switchboard.



This generator unit turned the tide at Bermuda

Here is the first American generator unit installed at the Bermuda Electric Light Co., Ltd. Prior to 1939, all the generating units were of British make. This unit changed the pattern . . . consisted of a Westinghouse Generator and a Nordberg Diesel Engine. The outstanding performance of this unit was responsible for another similar installation in 1950.

Westinghouse Generators create such acceptance because of their reliability—long life—performance. Once you specify Westinghouse you'll always specify Westinghouse. Take the fabricated steel rotor . . . it has been designed with such a high factor of safety that it is practically unbreakable. The all-steel frame makes possible a stator assembly having maximum strength and the permanent tightness of core that is necessary for a quiet, smooth-running machine. Electrical efficiency is tops, too . . . materials are so proportioned that the maximum efficiency of conversion is obtained from three-quarters to full load.

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Supervising

. . . continued from page 66 . . .

we feel as unjust. If such a tax is necessary let's make it universal, or abolish the idea.

Many State Municipal Leagues are taking up the fight, and in case you are a non-member of either the APPA or a State affiliated Municipal League, you can still voice an opinion by writing your Senators before it is too late. Since it is a little late to present your protest before the House Ways and Means Committee, we do suggest that you cooperate to the fullest extent with the APPA in registering your protest on such a tax if you feel it unjust and an added burden to your costs.

Completes Expansion

When the company's new Burbank, California plant went into full operation early in June, Aeroquip Corporation of Jackson, Michigan had completed its extensive expansion program which was timed to meet today's demand for greatly increased production. The Burbank plant, located in the heart of the West Coast aircraft industry, is operated by Aero-Coupling Corporation, an Aeroquip subsidiary. Other important expansion moves recently completed include the addition of a new 65,000 sq. ft. building to Aeroquip's main plant in Jackson, and the acquisition of another subsidiary, Metalco, Inc. with a plant in Cheboygan, Michigan. The total amount of space thus added to Aeroquip's facilities exceeds 100,000 sq. ft. Started more than a year ago when Aeroquip's management foresaw rising defense production, the plant expansion program was carried out without government prodding and with private capital. According to President Peter F. Hurst, sales to industrial and military users have reached an all time high with potential volume for the year about double that of the last year. Shipments in May were about three times greater than in May, 1950. Aeroquip manufactures Flexible Hose Lines, Self-Sealing Couplings and other products widely used on aircraft and numerous industrial products.

horn! It held the answer to survival.

In Dan'l Boone's day, a man had to keep his powder dry, just as Diesel owners have to keep liners and crankshafts in good working order.

But even with these critical items as hard to get as a fresh supply of gunpowder in the wilderness, Diesel users needn't worry. They NO LONGER need to REPLACE such worn out parts.

Even those checked off as scrap are brought back better-than-new with Vanderloy M and PORUS-KROME*—and for less than the price of replacements.

Parts restored in this way have the same longer-wearing life and higher efficiency that makes returns always greater than the cost of processing original equipment with PORUS-KROME.

That's a standard practice now with many Diesel owners.

And they've eliminated all over-size stocks — because glass-smooth, diamond-hard PORUS-KROME can easily be restored again when efficient working limits finally are reached.

It's the one sure way to *"keep your powder dry."*

★ ★ ★

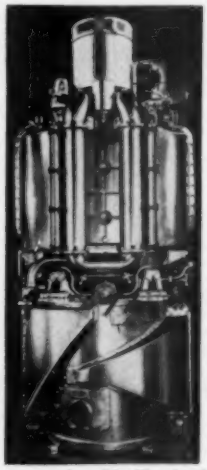
**PORUS-KROME is a dense, hard, wear and corrosion-resistant chromium, produced by the Van der Horst Corporation of America, and which gives working surfaces an infinite number of tiny oil-retaining reservoirs for perfected lubrication.*

VAN DER HORST CORPORATION OF AMERICA • OLEAN, N. Y.

U. S. PATENTS 1,048,578, 2,314,604 and 2,412,698

PORUS - KROME VAN DER HORST

The New Radial Submarine Diesel



The new radial submarine diesel engine turned over to the Navy early in June by the Cleveland Diesel Engine Division of General Motors was described by the Secretary of the Navy Francis P. Matthews as a revolutionary factor in submarine warfare designed to give the United States underwater supremacy. The new engine, announced in Washington by the Navy Department, was previewed in Cleveland by Secretary Matthews, interested Navy officials and the press. Five years and more than $10,000,000 were required to develop the new engine which has 16 horizontal cylinders and is so compact that it requires ⅓ less space than anything comparable used in World War II. For all its compactness the new diesel develops twice the horsepower per pound of any submarine engine previously used. Rear Admiral Wilson D. Leggett, Deputy Chief of the Bureau of Ships, declared that the new engine will give American submarines "superior characteristics to any submarine in the world today" and added that the Navy is depending on diesel power in preference to atom-driven underseas craft.

While many of the details of design and performance of the new engine are secret, Admiral Leggett explained that some of the advantages are the engine's power and compactness. For example, he said that if all the space saved were used for extra fuel it would give American underwater craft the greatest range ever achieved and that submarines equiped with the new diesel would be able to appreciably increase their torpedo fire power, radar, and other electronic equipment, plus carrying additional fuel. Four of these engines have already been installed in new "Attack" submarines according to George W. Codrington, Vice President of General Motors and General Manager of the Cleveland Diesel Engine Division. There is evidence that this marks the beginning of a program by the Navy to be prepared immediately to take

the offensive underseas, in the event of another World War. "This is not the only thing we have in store for the future," Secretary Matthews added cryptically. In pointing this up, the Secretary declared that the United States had almost lost two wars to enemy submarines and that the Navy has given submarines top priority on its agenda.

Admiral Leggett announced that besides the "Attack" submarine designed to hunt out and destroy enemy surface vessels, the Navy had recently announced production of the "Killer" submarine which will concentrate on destroying enemy submarines. Picket submarines will set up a radar screen to intercept enemy shipping. Without disclosing the horsepower of the new engine, Admiral Leggett said it weighed approximately 10 pounds per horsepower as compared with 20 pounds per horsepower in World War II and from 70 to 120 pounds per horsepower in engines in submarines immediately following World War I. The cost of developing the new engine was shared by the Navy Department and by Cleveland Diesel, which supplied 70% of the power for submarines in World War II. Some 400 supplier firms are involved in producing the new diesels, Mr. Codrington revealed.

Cummins Dealerships

Walter N. Westland

Division of the territory encompassing six New England states into two Cummins Dealerships is announced by L. W. Beck, vice president-sales, Cummins Engine Company, Inc., at Columbus, Indiana. Effective immediately, sales and service coverage for the states of Maine, New Hampshire, Vermont, Massachusetts, and Rhode Island will be handled by Cummins Diesel of New England, Inc., with headquarters at 201-09 Cambridge Street, Boston (Allston), Massachusetts. Walter N. Westland is president of the new Company. The sales and service of Cummins Diesels for the State of Connecticut will be conducted by Cummins Diesels Engines of Connecticut, Inc., 37 Airport Road, Hartford, Connecticut.

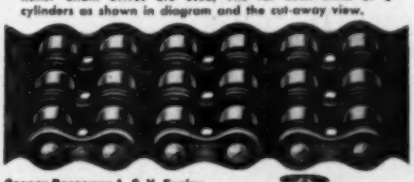
Mr. Westland joined the Cummins selling organization in 1947 after more than 20 years experience in the construction equipment industry. For three years, he was general sales manager of the Marion Power Shovel Company, Marion, Ohio, and at one time had served as New England district manager for that company.

More than 14,000 square feet are being used at the new location in Boston (Allston) for selling and servicing Cummins diesels. The Boston shop is equipped to completely overhaul and rebuild engines. A complete stock of Cummins-warranted parts also is available.

DIAMOND ROLLER CHAIN ASSURES BETTER TIMING DRIVES for V-Type Engines

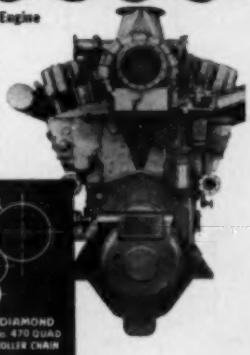
Hall-Scott V-Engines

On the Hall-Scott V-12 4-cycle, gasoline or gas industrial and marine engines, two Diamond No. 66 triple-strand Roller Chain Drives are used, one for each bank of 6 cylinders as shown in diagram and the cut-away view.



Cooper-Bessemer L. S. V. Engine

3700 H.P. Cooper-Bessemer L.S.V. 16-cylinder supercharged diesel and gas-diesel 4-cycle engine has Diamond No. 470 quadruple strand Roller Chain from timing drive camshaft to intermediate shaft and Diamond No. 148 auxiliary drive.



DIAMOND ROLLER CHAINS

1. Are adaptable to a wide range of shaft centers and speeds.
2. Are reversible and will drive from either face.
3. Create no end play.
4. Make close shaft centers and clearance tolerances unnecessary.
5. Are quiet when installed — Remain quiet.
6. Low in first and final cost.

In use for more than a quarter century on all types of engines, gas, gasoline, diesel and dual fuel from 5 H.P. to 5000 H.P. at speeds up to 10,000 r.p.m. in stationary, marine and land transportation service.

Diamond Engineers offer complete design and application service.

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Dept. 407, 402 Kentucky Ave.,
Indianapolis 7, Ind.

DIAMOND ROLLER CHAINS

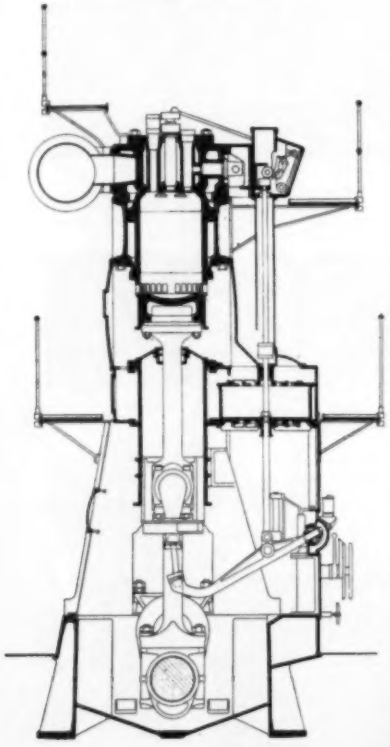
DIESEL SHIP "PRINS FREDERIK WILLEM"

By **WILBUR W. YOUNG**

THE diesel ship *Prins Frederik Willem* is the seventh "Lake-ship" in "Oranje Line" Maatschappij Zeetransport N.V. Rotterdam fleet, specially designed for European-Great Lakes trade via the St. Lawrence River. Having successfully completed the first leg of her maiden voyage she was seen in Calumet Harbor Terminal, Chicago June 16 under the auspices of the owners, the Terminal Corporation, Overseas Shipping Corporation and Werkspoor N.V., Amsterdam.

The latter, most ably and genially represented by Mr. F. G. van Asperen, fitted this interesting vessel with the first Werkspoor-Lugt engine to be installed in a seagoing ship. This recently designed engine, embodying many unique features will herein be described fully. It is basically a two-cycle, four cylinder, 600 mm. bore, 900 mm. stroke, direct reversible diesel, rated for normal output of 1800 bhp. at 164 rpm. unsupercharged and successfully burning heavy boiler oil.

First a few facts about the *Prins Frederik Willem*. Her overall length is 258 ft., the limit to clear the locks giving access to the Lakes; breadth moulded, 42 ft. and depth to shelter deck, 26 ft. 3 in. Her d.w. a.t. is about 2800 tons. An open shelterdecker with cubic capacity of 178,000 grain feet and 164,000 bale feet, she has four large hatches, clear holds and special lockers for valuable cargo.



The holds are served by eight electric winches and derricks and are electrically ventilated for transport of fruit, vegetables, flower bulbs, etc. The navigational equipment is as modern as today and consists of direction finder, radar, echo sounding device, gyro-compass, automatic steering gear, radio telegraph and telephone and clear view screen.

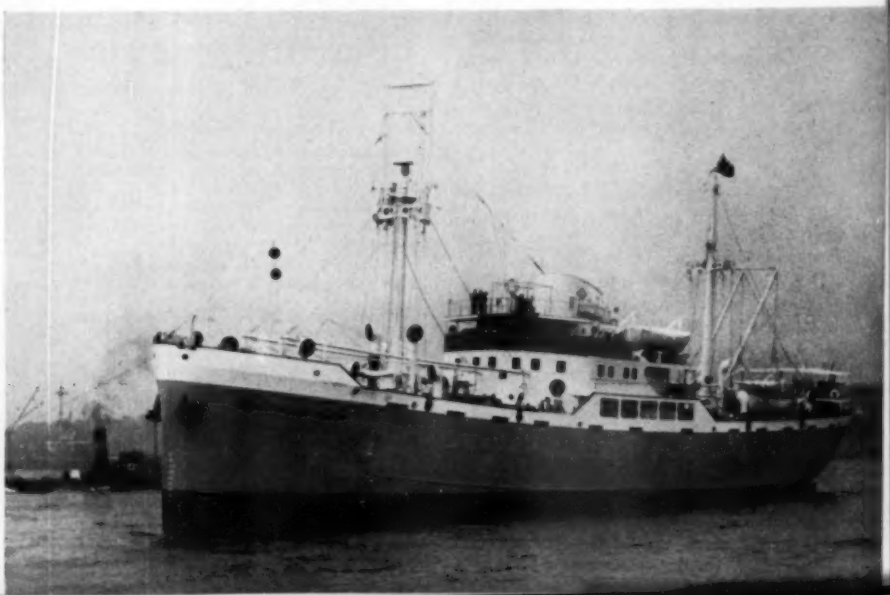
The main propulsion engine is the culmination of design and experimentation carried on by the late G. J. Lugt, chief engineer of the diesel engine department of Werkspoor, N.V. during the war and until his death in 1948 when Mr. E. G. van Asperen took over and carried the design to completion. Mr. Lugt's objective was to produce an engine which, by comparison with the well-known Werkspoor four-cycle engine with under-piston supercharging, would be more economical, simpler, lighter, more accessible, less costly to build, and would be able to use the heavier fuel oils. One might say "Objective Accomplished," when considering the engine in its present state, it's outstanding characteristics being: the employment of through scavenging with four exhaust valves per cylinder operated from one vertical pushrod; separate side scavenging pumps, one for each cylinder; crankshaft actuated fuel pumps; the absence of a camshaft; quick starting and maneuvering by a single hand wheel without servo-motor control, and ready accessibility and ease of dismantling. The engine is running on boiler oil of viscosity up to 3500 secs. Redwood No. 1 at 100 degrees F. and has a fuel consumption of about 0.352 lb. per bhp. hr. at loads between 75% and full output.

Considering the details of construction we find that the bed-plate is of ribbed cast iron and it carries the main crankshaft bearings, which are of simple and rugged design. The crankshaft is half built-up and is short and strong, the distance between the cylinder centers being 930 mm. or 1.55 times the cylinder diameter.

When supercharged the engine power can be increased to 2400 bhp., about two extra tons being needed for the pipes and the exhaust gas turbine blower, which can be placed anywhere in the engine-room or, if necessary, outside it. For the present installation the engine is, however, unsupercharged. The lower cast iron columns, bolted to the top of the bed-plate, carry the scavenging pump beams, which also house the double-acting scavenging pump cylinder and the guide cylinders for the main cylinder crossheads. They are of equal diameter to the liner and are constructed so that they can be withdrawn through doors at the back of the engine. In the scavenging beams there is also the scavenging air receiver, which is continued upwards to the lower liner with the scavenging ports.

The scavenging air receiver is closed at the front and back of the engine by detachable vertical covers, which facilitate inspection. A piston-rod stuffing-box separates the crankcase from the scavenging air receiver. The connecting rods are drilled for forced-feed lubrication. Each of the steel crossheads is designed to form one piece with its piston rod and there are two crosshead guide shoes which run in a guide cylinder. They consist of two half-cylindrical shoes of cast steel, lined with white metal and are arranged to permit adjustments being made to the clearance in the guide cylinder.

The crosshead pin is completely ground and is cylindrical in form. It is fixed in the crosshead in such a way that its bottom part bears over the whole length of the crosshead bearing. The crosshead also carries a ring on its bottom side, to which, by means of spherical articulated members, the links and lever for driving the scavenging air pump are connected. These levers and links have internal bores for the inlet and the outlet of the cooling oil for the main piston and guide shoes and for the lubrication of the crosshead bearings and the bottom end bearing, which is served with oil through the connecting rod bore.



All of these moving parts and the guide cylinders for the crosshead are so arranged that they can be assembled and dismantled sideways. The same facility applies to the steel piston with its five rings and scraper ring, which can be withdrawn sideways without having to take away the piston rod. For cooling the piston the oil passages in the central part of the piston are arranged as inclined nozzles, which impart a swirling motion to the cooling oil for the sides and crown of the piston. The arrangement gives a very cool piston and the temperature and condition of the cooling oil can be seen in windows at the front of the engine. The liner is in two parts, the upper portion, made in a special cast iron, fastens to the cylinder head.

The two parts of the cylinder assembly form one piece when assembled in the cylinder. The underliner is formed in two halves, so that it permits easy dismantling for inspection and replacement if necessary of the two piston rings. The cylinder covers are attached to the underside of the cylinder beam by heavy studs, which are screwed into the bottom of the cylinder head and are secured by nuts on the bottom side of the beam. Long through-bolts are fitted to hold all parts together from the bed-plate to the cylinder beam and so to take up the combustion forces.

The cylinder head contains a central fuel valve and four simultaneously operated exhaust valves. In front of the fuel valve is the air starting valve and behind it the safety valve and the decompression valve for maneuvering.

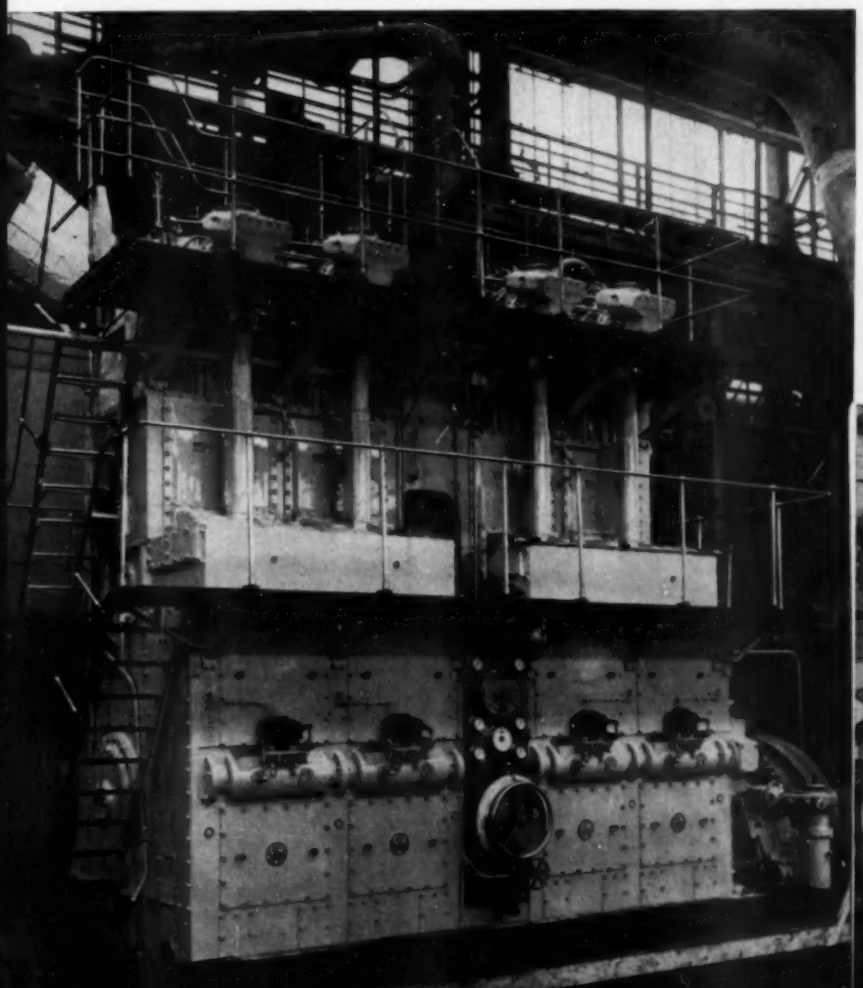
As will be seen from the drawing, the scavenging air piston rod is extended upwards and is used for the exhaust valve gear drive by means of cams and rollers and pull rods, each rod operating a pair of exhaust valves. There is no need for a camshaft. The working of this gear is smooth and practically silent, not unlike the valve gear of a modern horizontal steam engine. Fresh water is used for cooling the main cylinders, the cylinder head and the injection valves, and tell-tale fittings on both the inlet and outlet valves show whether flow is taking place. The valve gear is enclosed in a cast iron casing and an indicator lever is provided on the side of each casing.

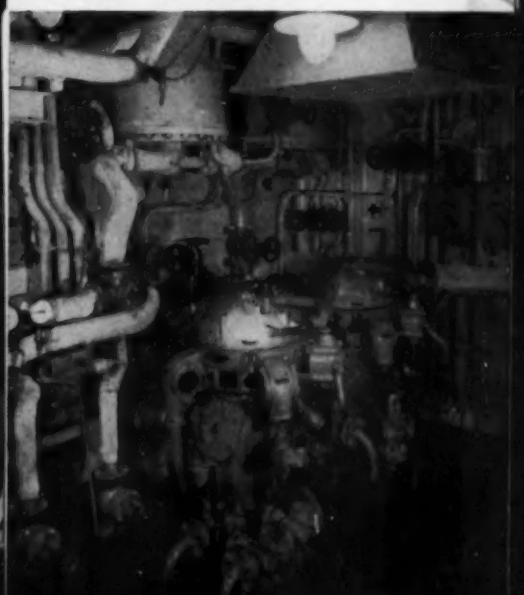
Interest attaches to the fuel pumps, which are placed between the two inner cylinders at the center of the engine. The fuel cams are mounted on the crankshaft and they drive the four fuel pumps through rods arranged vertically within the crankcase, the pump unit being mounted at about half engine height. For reversing, the fuel pump plungers are turned from the ahead to the astern position and by this movement the connections from fuel pump to fuel valves are interchanged.

For starting air the pilot valves are arranged in one block in the center of the engine beside the control panel. They are operated by a short camshaft, which is moved sideways to bring the ahead and astern cams into position. The engine controls are very simple. All maneuvering operations are combined in the single movement of a handwheel, which is interlocked with the telegraph reply lever. A single locking lever, behind the wheel, when thrown over, prevents the engine from being started in the wrong direction. By turning the control wheel from the central stop position the starting air camshaft is set to the required ahead or astern position and movement of the wheel in the same direction brings the starting valves into operation. Once the engine is running on starting air the further movement of the wheel automatically brings the fuel pump into action, while the final position adjusts the quantity of fuel for the desired speed.

The Aspinall type of inertia governor is installed at the flywheel end of the engine, allowance being made for adjusting the speed at which the governor cuts out. At the back of the engine there are well designed safety doors, which automatically release any crankcase pressure by means of a simple bell-crank lever and inclined spring, housed below the door. The thrust block is integral with the crankshaft and there is a turning gear on the flywheel.

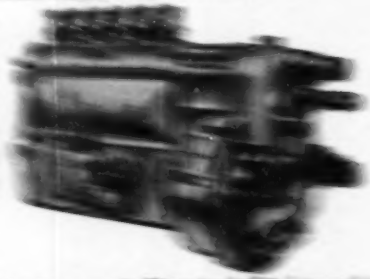
For dealing with the heavy fuel there are two DeLaval separators, one acting as a purifier and the other as a clarifier. To supply power for the auxiliaries two small Werkspoor 550 rpm. diesel engines with compressors for starting air and 220V, 88 kw. generators are installed. There is also installed a harbor set consisting of one Kromhout 30 hp. diesel engine driving a 20 kw. Thrige dc. generator and a Hamworthy starting air compressor. Thorough as the Dutch are, they either overlooked or hoped to operate without an exhaust pyrometer, but promptly on arriving at the first Lakes port of call, they placed an order for an Alnor pyrometer to be installed on the next visit to this port.





Pair of DeLaval centrifugals, one acting as a purifier and the other as a clarifier in handling the heavy fuels used on this ship.

Confidence Abroad



Opens Eleventh Diesel Shop

Cummins Sales & Service, Inc., operating ten Diesel Service Shops in the Southwest, has announced the opening of its eleventh shop at Pharr, Texas. J. E. Everroad, president of the company, in an announcement on the opening of operations in the valley stated that because of the numerous Cummins Diesel engines operating in and around the area the company had chosen Pharr as a base for its operations because of the city's important location at the "hub of the valley." The location of the shop itself is on Highway 281 which leads north and south from the highway terminus. The new building is of steel and stone construction and contains a display room and offices, complete parts room and service area and a large truck porte. The main building is 40x100 feet and the truck porte measures 50 ft. by 50 ft. The display room and offices are fronted by a "Mexican" type stone construction which is made in the valley. This is a pressed stone similar to the cut Austin stone so widely used in other parts of the Southwest.

An unusual feature of this new installation is the truck porte. This all-weather area is on the south side of the building and affords customers a place to bring trucks for service despite weather conditions. The size of the porte makes it easily accessible and its proximity to the parts and service area of the main building make servicing the trucks a simple matter. Over 33,000 feet of caliche covered parking area is provided for truck trailers and other types of vehicular parking. This newest in the chain of Cummins Sales & Service, Inc. service shops is now open and in full operation. It offers the 24-hour service that Cummins users in the Southwest have come to know and respect. The completely equipped shop and parts room are well stocked with latest types of diesel equipment and parts, and the factory trained personnel are on hand to perform service as needed. Two panel type service trucks operate out of the shop and are fully equipped to service engine installations at their point of operation. The store personnel is under the guiding hand of District Service Manager R. G. Barnes, former Sales Engineer at New Orleans, Louisiana. Otis E. Farley, who was transferred from the same position at Shreveport, Louisiana, is the new Store Manager.

Appointed Sales Manager

David McEwen

Clark L. Hastings, vice-president, Rochester Manufacturing Co., Inc. of Rochester, N. Y. has announced the appointment of David McEwen as sales manager. Mr. McEwen has had ten years of production experience in the plant on products supplied the farm tractor industry; oil pressure gauges, heat indicators, ammeters and fuel gauges. He will concentrate on the company's products for the tractor and heavy engine field and will be assisted in the sale of oil burner tank gauges by John W. Kershaw and of industrial thermometers by Ralph Foster.

DIESEL ENGINE CATALOG came off the press last month in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and designers. ORDER COUPON ON PAGE 29.

THIS QUICK-CHANGE HEAD REALLY SAVES DOWN TIME and MANPOWER

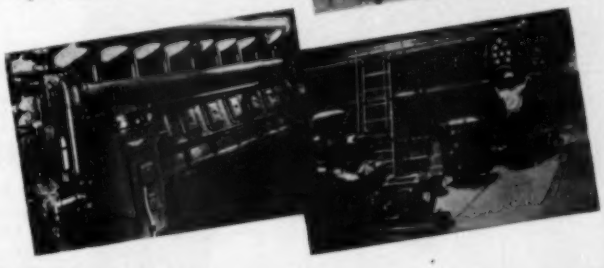
HOFFMAN FILTERS
for Diesel Fuel and Lube Oils

Simply back off the swing-bolts—turn a hand-wheel, and the cover of your Hoffman Cartridge Filter lifts and turns aside for fast, convenient cartridge changes!

Hoffman builds two series of cartridge filters. One employs Navy 7x18 throwaway units; the other uses 11x18 cartridges, either throwaway or repackable type. Both series provide efficient, dependable removal of contaminants from fuel and lubricating oils—for low cost.

WRITE FOR BULLETINS

Full descriptions and specifications are contained in Bulletins A-649 and A-703. Write for them. Illustrated here are three typical Diesel installations protected by Hoffman filters. Get the facts for your requirements.



FILTRATION ENGINEERING SERVICE... For the right answer to your filtering problems, a Hoffman filtration engineer will survey your requirements and furnish recommendations based on detailed analysis of all factors. Ask for this service—There is no obligation.

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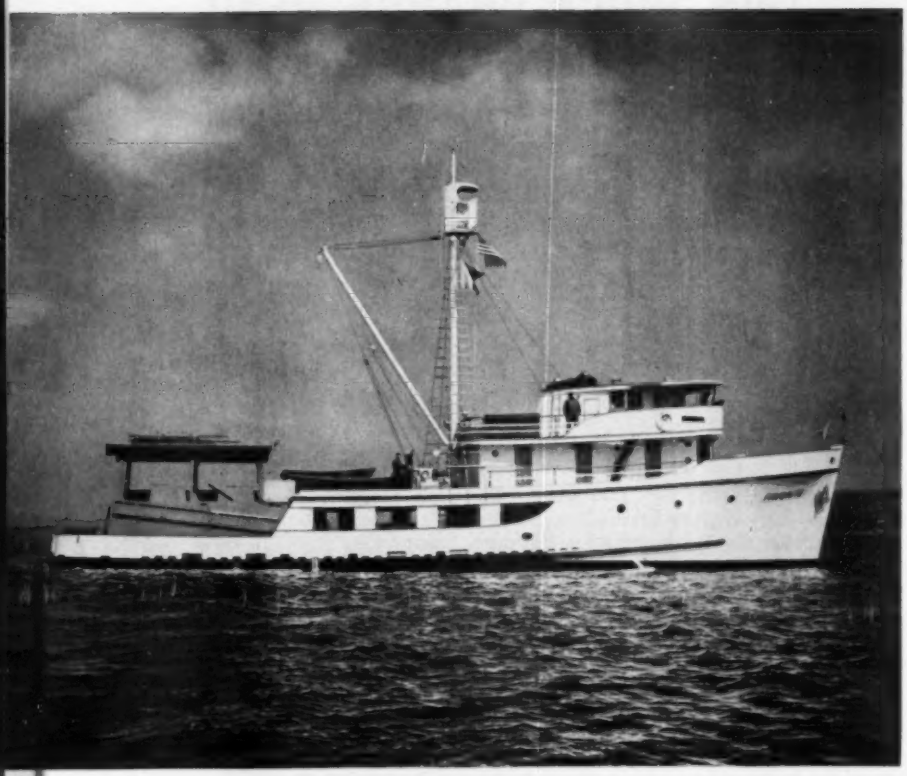
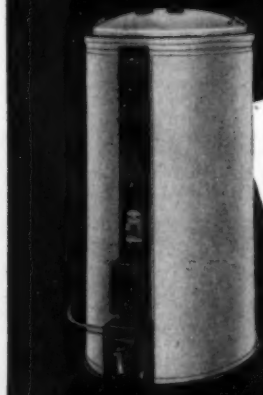
CANADIAN PLANT: CANADIAN HOFFMAN MACHINERY CO., LTD., NEWMARKET, ONT.



TUNA CLIPPER "FAVORITE"

By CHARLES F. A. MANN

RECENTLY completed for Manual and Tony Rosa of San Diego, is the 105 ft. wood and diesel tuna clipper *Favorite*, completed at Puget Sound Boat Building Corp. to plans drawn by James J. Petrich of Tacoma. She carries a 600 hp. Enterprise diesel, driving her at 11 knots. Twin 165 hp. G.M. diesels drive 75 kw. generators, and she packs 205 tons of frozen tuna in 13 compartments. Three 5½ x 5½ Baker ice machines; two 10-in. Campbell bait pumps and a battery of 2½ in. F.M. circulating pumps, photo-electric pilot; Coolidge propeller and Monel tailshaft are principal equipment features. The vessel is 25 ft. 6 in. beam and 15 ft. loaded draft and has tank capacity for 3000 gallons of fresh water; 26,000 gallons of fuel oil.



another New
HONAN-CRANE
OIL PURIFIER
for Another
New Diesel

A typical illustration of sound preventive maintenance. This Honan-Crane Purifier, installed with Rensselaer's new 2800 HP Nordberg Diesel, maintains lube oil in "new-oil" condition . . . keeps vital engine parts clean and free from damaging abrasives, acids, sludge and other oil contaminants.

time-tested performance
is HONAN-CRANE'S
best salesman!

The diesel-operated Municipal Plant at Rensselaer, Indiana, installed its first Honan-Crane Oil Purifier in 1941. In continuous service for the past ten years and still going strong, this unit has paid for itself many times over by maintaining diesel lube oil in a clean, safe condition . . . protecting generating equipment from costly shutdowns and repairs. That's why Rensselaer, like other Honan-Crane users, specifies Honan-Crane for all new equipment.

Write today for "The Facts About Clean Oil." Tells how plants, large and small, reduce operating costs, improve plant efficiency with sound Oil Purification programs.

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A SUBSIDIARY OF
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In Charge of Product Engineering

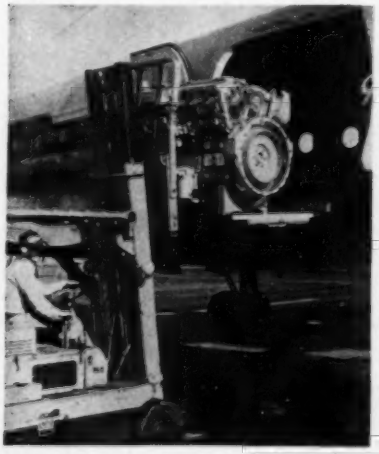
John Thomas

John Thomas has been appointed vice president in charge of product engineering of American Locomotive Company, it was announced recently by Duncan W. Fraser, president. Since 1948, Mr. Fraser has been manager of the locomotive division of American Locomotive, with headquarters at Schenectady. Prior to that, he was manager of the company's Auburn, N. Y. plant. He has been with Alco for 22 years.

Barton Mines Contracts for Diesel Engine

The largest producer in the United States of abrasive garnet—Barton Mines of North Creek, N. Y. —has ordered a SDH-6 diesel engine with a 580 kw. Electric Machinery Generator and auxiliary equipment from Worthington Pump and Machinery Corporation, Harrison, N. J. Two years ago an older Worthington type BB diesel engine was moved from the old site to a modern and handsome plant already housing a new Worthington type SDH supercharged diesel. This order for another 865 hp., 12 x 14, 600 rpm. unit will make the second supercharged diesel engine used to increase the present plant generating capacity for mining and processing of garnet. It is expected that the unit will be in operation in early fall. Barton Mines Corporation, located at the top of Gore Mountain in the Adirondacks, produces garnet—a hard technical abrasive for industrial use.

Engine on Air Tour



A new model Cummins diesel engine is shown being unloaded at San Francisco on arrival from Cleveland by United Airlines Cargoliner. The 4,500 pound engine will be displayed at various west coast cities. The twelve cylinders turn out 550 horsepower and it is rated as one of the most powerful high-speed diesels in current production. The housing in this model engine has been cut away and replaced with transparent lucite to show working parts.

JOHNSON BEARINGS 1901-1951

FIFTY YEARS OF PROGRESS IN SLEEVE BEARINGS

By sharing in the fifty-year development of automotive and industrial America, Johnson Bronze has become a leading manufacturer of Sleeve Type Bearings. Great changes have been made in Johnson Bearings in that time. New types and designs have been developed. New conceptions of bearing materials and refinement of alloys were important steps of progress. Metals have been combined for greater serviceability, lighter weight and lower cost to the user. Many of the Johnson Sleeve Bearings of today show only superficial resemblance to the types of fifty years ago.

Leading manufacturers in all fields find this vast experience and "know-how" accumulated since 1901 to be very helpful. Perhaps we can be of assistance to you in determining the correct bearing for each application . . . and in producing your requirements exactly to specifications. Why not write—TODAY?

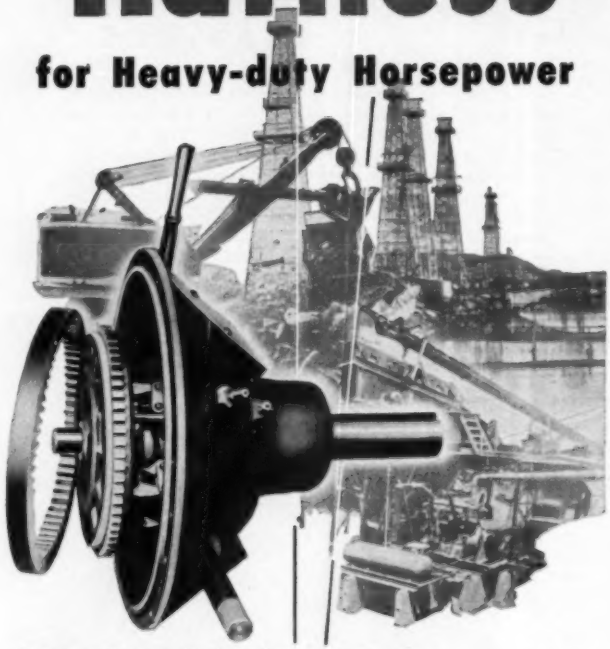
Johnson Bronze

445 SOUTH MILL STREET • NEW CASTLE, PA.

Call JOHNSON BRONZE at ATLANTA • BALTIMORE • BUFFALO • CAMBRIDGE CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DENVER • DETROIT • INDIANAPOLIS JACKSONVILLE • KANSAS CITY • LOS ANGELES • MINNEAPOLIS • NEW YORK • NEWARK PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO • SEATTLE

Harness

for Heavy-duty Horsepower



Twin Disc Friction Power Take-Off, able to handle the entire horsepower range up to and including 350 hp per 100 rpm of the prime mover, is conservatively rated for longest wear-life. Known everywhere for its single-point adjustment.

When you hear the full-throated throb of heavy-duty engines, chances are you'll find their power *applied* and *put* to work through a positive-action Twin Disc Power Take-Off (Friction or Hydraulic) or Torque Converter.

For Twin Disc, the world's largest exclusive manufacturer of industrial clutches, offers the most complete line of standard units, both friction and hydraulic, for the widest range of prime movers.

They engage so smoothly, pick up the load so smoothly, that operators in *many* industries swear by them as exactly the RIGHT *harness for heavy-duty horsepower.*

You'll find the Twin Disc name, too, on clutches to apply fractional horsepower . . . in fact, on *any* power-application problem, it will pay you to obtain the recommendations of Twin Disc Engineers.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

Named Vice-President

Boyd S. Oberlink

W. A. Roberts, president of Allis-Chalmers Manufacturing Company, announced that the board of directors elected a new vice president, Boyd S. Oberlink, who has been serving as assistant to the vice president in charge of Tractor Division. Mr. Oberlink joined Allis-Chalmers in 1934 as an industrial service man and demonstrator in the Tractor Division. In 1936 he was named assistant supervisor of the Allied Equipment Department in the same division. In 1940 he was named manager of the Tractor Division's Washington, D. C. office. He returned to Milwaukee as assistant Industrial Sales Manager in 1943 and was named assistant to the executive vice president in charge of the Tractor Division in 1946.

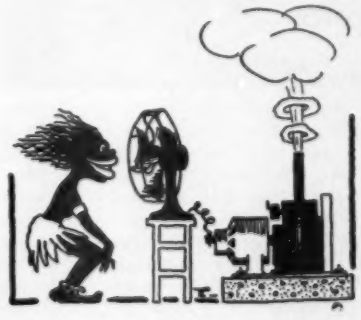
Issues 12-Page Booklet

A new 12-page booklet, titled "International Power Lowers the Boom on Pipelaying Costs," has been published by the International Harvester Company. The part International crawlers play in handling every phase of the pipelaying business is presented in picture-caption style. In addition, the two-color booklet contains a Selectograph showing the lifting capacity of each International tractor when working with a matching Superior pipeboom. For a copy of the bulletin, send your request for Form CR113A to Consumer Relations Department, International Harvester Company, 180 No. Michigan Ave., Chicago 1, Illinois.

Equipment Sales Engineer

A. P. Jeffrey

The Swarthout Company, manufacturer of power plant and ventilating equipment, has announced the appointment, effective immediately, of A. P. Jeffrey as power plant equipment sales engineer for the Albany and Schenectady territory. Mr. Jeffrey, a graduate of Case Institute of Technology, Cleveland, Ohio, will take over his new duties at 11 Dutch Village, Albany 4, N. Y.



ATLANTIC METAL HOSE
GUARDS
DIESEL LIFELINES
AIR · FUEL · WATER · EXHAUST

ATLANTIC flexible metal hose does a *better* job of controlling vibration of these vital lines and insuring their continuous, trouble free operation—because each section is *Job Tested and Guaranteed to Do Its Job!*

That's why more and more purchase requisitions read "Order from Atlantic for Every Diesel Need!" Furnished in all workable metals — ⅜" to 10" I.D. inclusive . . . with fittings as desired.

Write for Diesel Bulletins 1020 and 50A • See our Catalog in Sweet's File for Product Designers

ATLANTIC
METAL HOSE CO., INC.
102 W. 64th St. · N. Y. 23, N. Y.

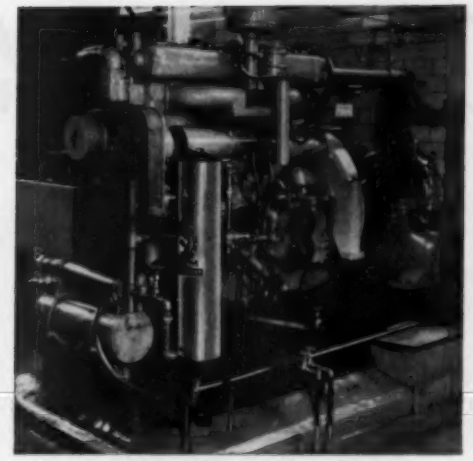
Sweeney
POWERENCH
TOOLS

for diesel engine maintenance

NO. 220-4 POWERENCH
—as pictured with Torque Indicator for Electro-Motive Crab. Nuts...provides 7.2 to 1 power ratio...saves up to 80% man hours.

8D2 Send me information on complete line of Sweeney POWERENCH Tools.
Name
Address
City State

B. K. SWEENEY MFG. CO., DENVER 17, COLO.



Fram Filter Installation on Murphy Diesel at New London, Conn., Waterworks

FRAM Filters Assure Dependable Diesel Operation at Pumping Station

PUMPING STATION Supervisor Walter F. Mahoney says words cannot express the excellency of Fram Filters. This station operates 24 hours a day, 7 days a week, pumping water from reservoir into large storage tanks which supply New London, Conn., with water. Reliable operation is vital. Without it, the city would be without water. Fram Filters remove sludge, grit, abrasives and other impurities from lubricating oil, prolong engine life, cut down-time and maintenance costs.

FRAM Filcron Filters Do the Job Better!

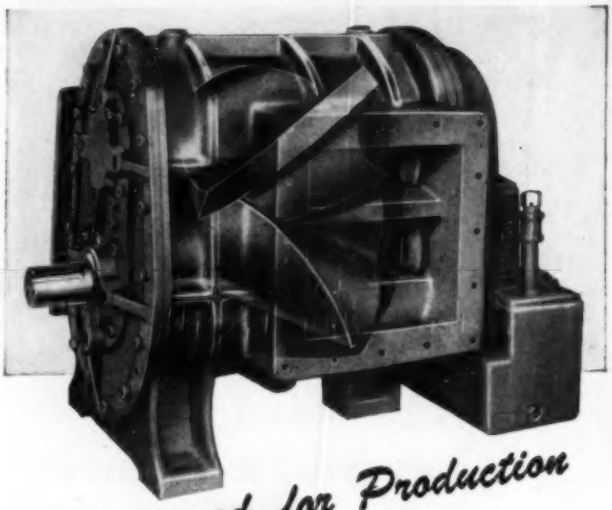
- *Remove solid and abrasive contaminants 1 micron (.000039") and larger*
- *Minimize Engine Wear*
- *Reduce Engine "Down-time"*
- *Extend Engine Life*
- *Lower Operating Costs*

No matter what your Diesel oil filtering problem—either lube or fuel—Fram can help you conquer it. Write for full information today to:

FRAM CORPORATION, Providence 16, R. I.
In Canada: J. C. Adams Co., Ltd., Toronto, Ontario.

FRAM *Filcron*
THE MODERN OIL FILTER

The STANDARDAIRE *Axial Flow* BLOWER ~



Engineered for Production

TO MEET the increasing demand for Standardaire Blowers our manufacturing facilities have progressed from custom built techniques to precision production methods for the principal components of the blower. In addition to other improvements, new manufacturing processes and equipment are now being used to generate the cycloidal form, screw type main and gate rotors on a production basis without sacrificing precision and accuracy of fit—important details in maintaining the "air screw" action feature of the Standardaire Blower.

Through this unique achievement in production engineering it is possible for Standard Stoker to offer industry a Standardaire Blower with the design features and efficiency of a custom built job at the availability of a quantity production unit.

Consult with our engineers on how the modern design Standardaire Blower can be adapted to suit your requirements. Write READ STANDARD CORPORATION, Dept. E2, 370 Lexington Avenue, New York 17, New York.

BLOWER-STOKER DIVISION

FORMERLY The Standard Stoker Co., Inc.
ONLY THE NAME IS CHANGED

READ STANDARD
CORPORATION

NEW YORK • CHICAGO • ERIE • YORK • LOS ANGELES

Marine Diesel Specialist

R. Raymond Ewart

John S. King, Cincinnati branch manager, Fairbanks, Morse & Co., recently announced the appointment of R. Raymond Ewart as marine diesel specialist to cover those territories with principal centers located in the Ohio River Valley, the Kanawha River Valley in West Virginia, and the Cumberland River Valley in Tennessee. Mr. Ewart joins the Fairbanks-Morse organization with a wealth of experience in marine diesel work. He has attended Monmouth College, Monmouth, Illinois, the U. S. Maritime Academy, Kings Point, Long Island, N. Y., and the University of Pittsburgh, Pittsburgh, Pennsylvania. For a period of four and one-half years, he was an instructor in diesel engineering theory at the Pittsburgh Diesel School, Pittsburgh, Pennsylvania. He is a licensed stationary engineer, a licensed marine engineer, steam and diesel, and a member of the Propeller Club of the United States. Mr. Ewart has also written a diesel text book "Industrial Diesel Power," which will be published within the next six months.

Shift to Diesels Slashes Costs

Great Northern railway's increasing shift to diesel locomotives is sharply cutting operating costs, F. J. Gavin, president, told stockholders recently. Despite increased service resulting from a larger volume of traffic, charges for locomotive repair and fuel were $1,300,000 less than in 1950. The railway's ownership of diesel equipment increased from three units in 1938 to 424 at the end of last year. The road bought 80 new diesel locomotives in 1950 at a cost of more than $17 million. The gross revenue of the railway hit an all time high last year and was 7.2 per cent higher than the preceding year. That and the large savings in operating cost due to dieselized equipment enabled the company to record earnings 50 per cent more per share than in 1949.

Re-Elected President

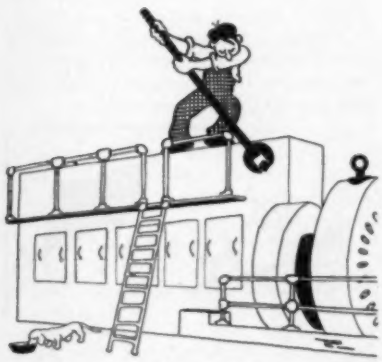
The board of directors of Allis-Chalmers Manufacturing Company re-elected W. A. Roberts as president and also named other officers of the firm. Mr. Roberts and other directors were re-elected to the board in the annual meeting of stockholders held prior to the meeting. Directors named, besides Mr. Roberts, are James M. Barker, Chicago, Illinois; Fred Bohen, Des Moines, Iowa; W. C. Buchanan, Milwaukee, Wisconsin; Hugh Comer, Sylacauga, Alabama; James D. Cunningham, Chicago; Edmund Fitzgerald, Milwaukee; W. C. Johnson, Milwaukee; Ernst Mahler, Neenah, Wisconsin; Louis Quarles, Milwaukee; and Leigh Willard, New York, New York. The board of directors elected a new Allis-Chalmers vice president, Boyd S. Oberlink, who has been serving as assistant to the vice president in charge of the tractor division. Mr. Oberlink will continue in the same division.

DIESEL ENGINE CATALOG came off the press last month in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and designers. ORDER COUPON ON PAGE 29.

New Office Building

The new office building, recently completed by the American Air Filter Company, Louisville, Kentucky, can lay claims to having the cleanest air of any similar building in the country. Three types of their filters installed in series are used in the air conditioning systems. Outside air is filtered through Multi-Duty automatic viscous filters, Electro-Matic automatic electronic precipitators then through Electro-PL dry type units. Recirculated air by-passes the Multi-Duty but is cleaned by the other two filters. The reason for this triple filtration is to protect the building interior when new models or designs are tested in the system and also to display the various types of AAF filters and precipitators in actual operation. The air conditioning is divided into two systems—one serving the front or south side of the building and the other the north side. The "south" plenum chamber is constructed of glazed tile, instead of the usual sheet metal, with plate glass windows on the aisle side. Flush ceiling type fluorescent lights permit viewing the equipment from outside. This system adjoins the exhibition space where show models of all of the company's products including those of the Herman Nelson Division are displayed.

A modified Carrier Weathermaster system is used in the new AAF office building with the heating coils and mixing dampers enclosed in Herman Nelson Unit Ventilator Cabinets, another of the Company's products. A thermostat in each office permits individually controlled temperatures to suit the occupant. Humidistats located at various points in the building control the moisture content of the air. The executive wing of the building, which includes the directors' room, library and the offices of the company's officers, is paneled in matched grain walnut. The sales, advertising and export departments are located on the second floor; administrative, purchasing and accounting are on the first floor. The new building was designed and built by the Austin Company with Ronald and Associates, Louisville, the heating and air conditioning engineers.



IS WASTE HEAT WASTING YOUR MONEY?

MAXIM

HEAT RECOVERY SILENCERS CONVERT WASTE EXHAUST HEAT TO USABLE STEAM or HOT WATER

A big Los Angeles Sewage Disposal Plant found that Maxim Heat Recovery Silencers provided all the steam necessary for plant heating as well as heating the sludge—*and from exhaust heat that would otherwise have been wasted.*

Perhaps your own operating expense picture can be improved by this simple and effective way to provide extra steam or hot water for heating or processing operations while at the same time effectively silencing exhaust noise. Our engineering department will be glad to make recommendations.

Automatic Controls

In figure E water is low and there is less effective heating surface (heating surface in contact with water), hence lower steaming rate.

In figure F water is high and gives greater effective heating surface — higher steaming rate. Steam pressure regulated valves control the amount of water to produce desired steam capacity.

Consult MAXIM

THE MAXIM SILENCER COMPANY 94 HOMESTEAD AVE., HARTFORD 1, CONNECTICUT

Gentlemen: Please send me your Bulletin on Heat Recovery Silencers

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COMPANY _____

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SM251

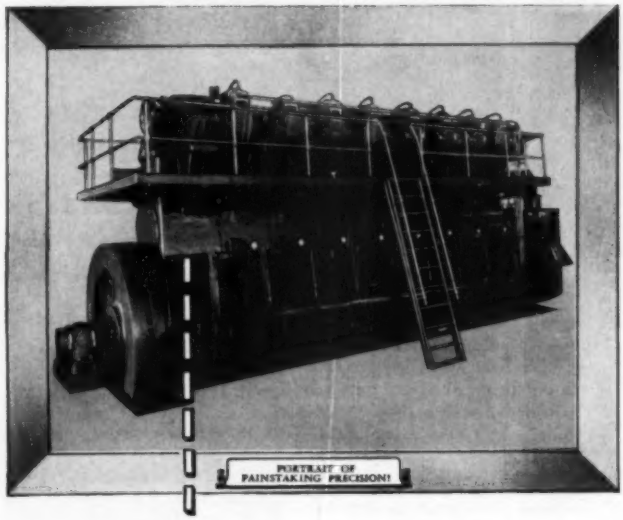
Appointed Secretary of Mack Trucks, Inc.

E. J. Dinkel

Election of E. J. Dinkel as secretary of Mack Trucks, Inc. has been announced by E. D. Bransome, president and chairman of the board. Mr. Dinkel, who attended Rutgers and was graduated from St. Lawrence University with a bachelor of law degree, is a member of the bar in both New York State and New Jersey. Prior to joining Mack in 1946 as industrial relations director at the Company's New Brunswick (N. J.) plant, he practiced law and taught at Rutgers, where he is still a member of the faculty. Named field personnel manager in 1949, Mr. Dinkel moved to the Company's home office, Empire State Building, New York City, where he will continue to make his headquarters. In addition to his new duties, he will remain active in labor relations.

Manual on Hydraulic Control

A handy pocket-sized guide on the operation and care of the "Direct Acting" hydraulic control of P&H power cranes and shovels has just been released by Harnischfeger Corporation of Milwaukee. It tells operators how to get the utmost efficiency out of this system. The 28-page booklet contains complete information on the hydraulic control system and describes the correct procedure for dismantling, adjusting and replacing parts. Identification of parts is made easy by the use of numerous keyed photographs and cutaway drawings. A four page "foldout" diagrammatic illustration shows the entire hydraulic system. Copies of this complete reference guidebook will be mailed free to owners and operators of power shovels and truck cranes. Write Harnischfeger Corporation, 4400 W. National Ave., Milwaukee 14, Wis.



You Can Count on Fulton Diesels

For Dependability..For Economy

Smoother-running • peak operating efficiency • greater fuel economy • less wear and tear • quick, easy replacements that save time and money . . .

Because **. . . even the heaviest parts of every Fulton Diesel are machined to such close tolerance that they are completely interchangeable.**

FULTON

FULTON IRON WORKS COMPANY

SAINT LOUIS 14, MISSOURI

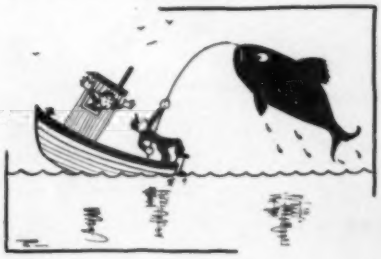
Engineers Advanced

Several changes in Cooper-Bessemer's engineering organization have been made by Ralph L. Boyer, vice-president and chief engineer. The three changes recently made in this engine and compressor builder's engineering staff now provide more adequate management direction to Cooper-Bessemer's extensive program of research development work already under way, according to Mr. Boyer. In addition to Mr. Boyer, vice president and chief and Mr. E. Frederick, assistant chief engineer, the Cooper-Bessemer's new Office of Chief Engineer now includes: T. O. Kuivinen, R. F. Kymer and W. R. Crooks as assistants.

Under the new engineering management plan, technical matters will be handled by Mr. Kuivinen. Liaison or coordinator of activities between engineering and production will be directed by Mr. Kymer. Mr. Crooks will assist in general administrative capacity as well as direct his efforts in research and development projects. Mr. Crooks, formerly resident engineer at Cooper-Bessemer's Grove City plant, is already well known to the entire industry for his technical achievements in supercharging of spark ignited gas engines, explains Mr. Boyer. His former activities at Cooper-Bessemer's Grove City plant will be handled by Mr. Kymer.

Training School

Inaugurating its largest training program for army personnel since World War II, the service department of Caterpillar Tractor Co. at Peoria, Illinois conducted three schools for the Corps of Engineers. About 90 men, selected on a basis of their experience, attended the program, which included two weeks on diesel engines, three weeks on transmissions, and a week on the rehabilitation of parts. The schools extended through June. The school had been established under a contract with the U. S. Corps of Engineers. Under a similar contract, Caterpillar trained 1200 engineers between 1942 and 1944. Trainees included personnel doing field and base depot maintenance.



Locomotive Assembly Line

One of the world's newest applications of the conveyor assembly line principle—complete locomotive cab assemblies for General Motors freight, passenger, switching, and general purpose diesel locomotives are put together on this moving assembly line at Electro-Motive Division's Plant No. 2 at 900 E. 103rd Street, Chicago. This is the first such use of a moving assembly line by a locomotive manufacturer.

Miami Water Treatment Plant

The Southwest Water Treatment Plant of Miami, Florida, now under construction, has recently ordered four diesel engine driven pumping units from Worthington Pump and Machinery Corporation, Harrison, N. J. Four 16-LCS-4 Worthington horizontal centrifugal pumps are to be driven by Worthington SDR-5 diesel engines of 825 hp. each, through Worthington J-6 speed increasing gears. One of these engines is arranged so that it can be quickly disconnected from the pump and coupled to a 750 kva. Electric Machinery generator. The plant will supply water for Miami at an initial capacity of 40 million gallons per day. Eventual capacity will be 80 million gallons of water per day. The plant serves part of the area south of the Miami River. The plant will be completed in 1954.

New Nordberg Distributors

Appointment of three new distributors for Nordberg 4FS four-cycle one and two cylinder Diesel engines has been announced by Nordberg Manufacturing Company, Milwaukee 7, Wisconsin. The new distributors and their assigned territories are: Houston Engine & Pump Company, 1939 St. Bernard Street, Houston 1, Texas (Gulf Coast of Texas and territory within a one-hundred mile radius of Houston, Texas); O'Keefe Motors Inc., 403-15 Samuel Street, Trenton, New Jersey (northern half of New Jersey); Midwest Utilities Power Equipment Corp., 1270 Augusta Blvd., Chicago, Illinois (northeastern Illinois, Indiana and western Michigan).

Established in January 1946, Houston Engine & Pump Company maintains a completely equipped engine rebuilding and repair shop staffed with skilled mechanics and service engineers. In addition to the various types of equipment necessary for the operation of this shop, the company also has magneto and injector repair departments, magnaflux equipment and a Clayton engine dynamometer. The Houston organization maintains four outside service field men who are constantly available to the oil production and marine industries. Officers and directors of the company are as follows: Mr. T. N. Hunt, President; Mr. J. P. McKenzie, Vice-President and General Manager; and Mr. U. V. Seales, Secretary-Treasurer.

O'Keefe Motors Inc. was organized in 1940 by company president William O'Keefe who has been associated with the automobile business since 1916 and in business for himself since 1933, selling and servicing automobiles, industrial equipment and associated products. The company service department covers 5,000 square feet and the sales room in which is displayed cars, trucks, generators and power plants covers 4,000 square feet. In a fully equipped machine shop and service station, facilities are provided for servicing all equipment sold by the company.

Midwest Utilities Power Equipment Corp. was established in August 1948 and company president A. A. Beaupre has been in the electrical and related industrial fields since 1925, starting as an apprentice electrician in the U. S. Navy. Mr. George Steiner, secretary-treasurer, has been associated with industrial power machinery throughout the country for the past 30 years. Other officers of Midwest Utilities Power Equipment Corp. are Messrs. R. Beaupre and E. Steiner, vice-presidents, M. B. Fisher, sales manager, and J. T. Williamson, service manager. Excellent sales and service facilities are maintained at the company's Augusta Boulevard address and the personnel in charge have had wide and diversified experience in their particular field.

HOW BONNEVILLE

Turns Potash into "Gold"

In 1948, this remote Bonneville Potash Plant on the Great Salt Flats in Utah faced serious problems. Tough, costly operating conditions and dwindling market prices demanded action. Production costs had to be "cut" drastically! But how?

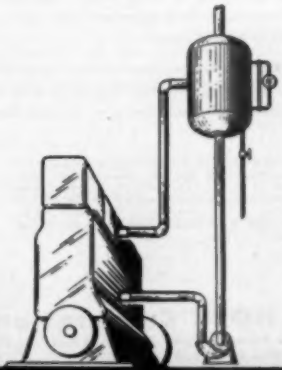
The answer **came in September, 1949, when a Vapor Phase equipped 480 HP Standard Worthington Diesel engine was installed. (See photo at right.)**

Besides converting the engine into a super-efficient power and lighting unit, Vapor Phase permitted the use of a cheap, heavy, high sulphur content engine fuel oil, cutting the normal fuel bill in half. It supplied steam for heating the fuel oil, water, space, etc. It solved the fresh water problem in this isolated desert country.

Here was the economy-plus system that answered every requirement, to "turn potash into gold!"

Thanks to Vapor Phase, this standard Diesel averages 14.25 kw/hrs per gallon on cheap heavy fuel. Lube oil averages 3 gallons per 24 hrs., or 4,320 sea-level-rated HP/hrs per gallon. Lube oil change has been made each 3,000 hrs. instead of the customary 500 hrs. And this plant, since the Vapor Phase system was installed, has produced annually over 70,000 tons of commercial potash *efficiently and profitably!*

NOW, after two years of successful operation, power facilities in this Bonneville Plant have been tripled with the addition of a *Vapor Phase equipped* American Locomotive Co. ALCO DIESEL Engine, Model 12½ x 13, 810 HP @ 600 rpm. With this added power and heat performance, a new high in potash production, at ridiculously low operating costs, is being enjoyed.



Modern Vapor Phase, now serving more than 30 different types of old and new engines of all sizes, on thousands of varied jobs, is the *proven lowest cost system* in every way—first cost, operation and savings accrued.

Vapor Phase reduces engine operating costs to a new low—provides record engine efficiency unaffected by ambient temperatures or conditions—doubles and trebles engine life.

—Permits use of low-cost engine fuels, even untreated acid fuels, without harmful effect,

—Eliminates need for expensive boilers, heaters, heat exchangers, troublesome fans, belts, radiators or costly cooling towers, upon which your requirements may now depend.

AND THAT'S NOT ALL!

Vapor Phase equipped engines *also* serve the multi-purpose job of generating steam, heating water, fluids, space or other process (including cooling or heating through air conditioning systems)—each as required or all at the same time, for the cost of engine operation *only*.

VAPOR PHASE pays off in Savings alone, the first year. The unit costs nothing to operate and is good for life.

Write or Wire for Information Applying to Your Specific Needs

Offices in Most Principal Cities

ENGINEERING CONTROLS, Inc.
2835 East Eleventh St., Los Angeles 23

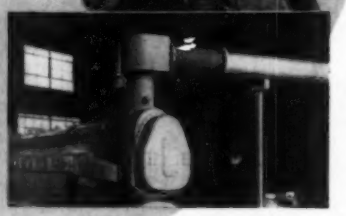
Dieselized Interurban Cars

The stainless steel diesel car known as the RDC, built by Budd and powered by two Detroit Diesel engines has gone into interurban service between Detroit and Midland. Designed for feeder, branch line or commuter service, the car is 85 ft. long and has seating capacity for 49 passengers. It also has space for a railway postoffice and baggage compartment. The car is air-conditioned and sound-proofed. Air-foam cushion seats and large knee-action springs on the four-wheel trucks make for an extremely smooth ride. The car has a top speed of 83 miles per hour. The 140 mile trip to Midland is made in four hours with stops at intermediate stations and makes the return trip the same day. The riding public, the operating crew and the officials of New York Central have expressed their complete satisfaction with the new service.

Further Expansion

A major expansion of engine production capacity, involving new facilities to cost $6,000,000, is announced by Irwin Miller, president of Cummins Engine Company, Inc., Columbus, Indiana, following recent approval by the Board of Directors. This third major expansion program within the past nine months will increase production capacity at Cummins at least 50 per cent over the 1950 record high level. The new $6,000,000 two-year expansion program matches the more than $6,000,000 already expended by Cummins in the five-year period following World War II for additional facilities. It follows closely the new $1,100,000 Stores Center Building, 200 feet wide and 460 feet long (2.1 acres), started last September, and the $400,000 authorized only sixty days later to more than double the production of Cummins' latest design "DD" fuel pump involving an extension of 9,600 square feet to the new "DD" fuel pump building which was completed only 18 months ago, and installation of additional high-precision machine tools in this department. Production capacity in the five years ended December, 1950, was increased at Cummins about 60 per cent. The Company currently is operating a three-shift, six-day week, and employs about 2,750 people. Although declining specific predictions on future employment levels, Company officials pointed out that the planned higher production will require increases.

Large Diameter CMH REX-WELD CORRUGATED FLEXIBLE METAL HOSE



the answer to motion control for:

Diesel Engine Air Intake and Exhaust Lines • Tank Settling Connections • Safety Valve Vent Piping • Compressor Vibration Connections • Heavy Duty Loading and Unloading • And Many Other Services

Wherever large diameter connections must have the flexibility to absorb vibration or expansion and contraction, correct for misalignment or allow movement, and yet provide the rugged durability of metal, CMH REX-WELD Type RW-75 is the answer. REX-WELD Type RW-75 is the flexible connection that requires no packing, no periodical maintenance. All metal construction is completely gas and liquid tight.

For full information and data sheets see your local CMH distributor—look for his name in your classified telephone directory—or write direct.

CMH REX-WELD Type RW-75 is helically corrugated flexible steel hose and is made in sizes from 5" to 24" I.D., inclusive. Furnished with standard pipe nipples, couplings, fixed or floating flanges. Flanges to customers design can also be attached. Where required RW-75 can be supplied with metal braid covering.

Flexon Identifies C M H products that have served industry for over 49 years

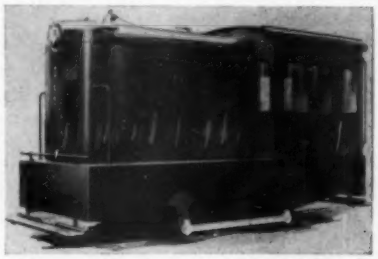
CHICAGO METAL HOSE Corporation

1325 S. Third Avenue • Maywood, Illinois • Plants at Maywood, Elgin and Rock Falls, Ill.

In Canada: Canadian Metal Hose Co., Ltd., Brampton, Ont.

CMH ONE DEPENDABLE SOURCE for every flexible metal hose requirement

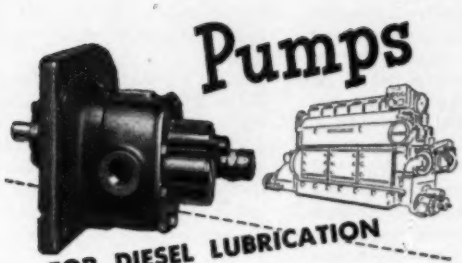
New Series Locomotives



A new series of dieselized Davenport Industrial Locomotives with torque converter drive have been announced by Davenport Locomotive Division, Davenport Besler Corporation, Davenport, Iowa, manufacturers of Davenport and Porter Locomotives. These hydraulic drive locomotives are obtainable in a range of sizes and gauges to meet the requirements of individual operating conditions. They may also be gasoline engine equipped. The locomotive pictured above is of 20 tons, 24-in. gauge and was built for service with a tie treating company. It is equipped with a No. 6080 General Motors diesel engine and an Allison torque converter. Among the benefits claimed for torque converter drive is smooth, quiet transmission from one speed level to another; absence of engine slowdown during speed changes, freedom from the transmission of load shocks or jerks which make for wear and tear on mechanical parts and assure easier operation and greater work output. Additional information may be obtained by writing to Davenport Locomotive Division, Davenport Besler Corporation, 2305 Rockingham Road, Davenport, Iowa.

Orders 132 More Diesels

Walter S. Franklin, president of the Pennsylvania Railroad, has revealed that the carrier has placed orders in the past few weeks for an additional 132 diesel locomotives costing $45 million. Exclusive of this newest order, the railroad will have 1,036 diesels in service by fall. At that time, 83 percent of the road's passenger service, 76 percent of switching service and 56 percent of freight service will be handled by dieselized locomotives.



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FOR DIESEL LUBRICATION

THE rotary geared pump shown above is particularly suited for diesel lubrication systems. It has a special flange mounting to facilitate installation together with provision for tachometer drive. Thousands of Brown & Sharpe Pumps are now providing trouble-free service for transfer, lubrication and booster systems. Get acquainted with their reliability and economy. Write for Catalog. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

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● Our 75 years experience, trained personnel and modern facilities are at your command.

MANUFACTURING and REPAIRING of heavy castings, crankshafts, bearings, connecting rods, pistons, liners, cylinder heads, valves, etc.

Obsolete parts and items no longer stocked by the engine builder need not keep your power plant equipment out of service.

Our complete line of especially engineered and developed portable machines and "On The Job" equipment may save you valuable time and expense.

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We got a tough assignment back in '49. Our customer needed a tower which would cool more than 4,000 gallons of recirculating water per minute from 105° down to 85° F., only 5° above the ambient wet bulb temperature. His entire process depended completely on 85° water—there could be *no* excuses! Could we do it?

We could, and we did. A few months later the Pritchard series "J" Induced Draft Cooling Tower with separate coil shed pictured above was put into operation.

Today, according to the plant superintendent, this tower is consistently equalling or exceeding the design performance in accordance with the test procedures outlined by the ASME, with the operating crew taking their own test readings.

Why don't you, too, find out about the advantages of using Pritchard Cooling Towers in your plant? Consult your nearby Pritchard representative for full information.

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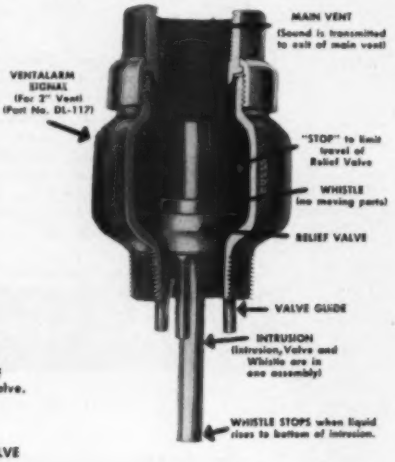
FUELING SIGNAL DEVICE

OVERFLOW spillage in diesel fueling should not be accepted as inevitable. A dirty gauge glass, a momentary distraction by the attendant frequently leads to substantial overflow with consequent waste and hazard. When filling at two hundred gallons per minute, a spill of one second exceeds three gallons. Railroads are speeding up the servicing of the locomotives. The importance of adopting progressive and efficient methods is widely recognized. Scully Signal Company has pioneered in the development and promotion of simple and foolproof fill signals. These have been widely adopted in the petroleum industry. Over two and one-half million homes are now equipped with Ventalarm Signals, which allow the driver to fill the tank without entering the house or disturbing the householder. Not only has the Ventalarm Signal substantially eliminated all spillage but it has decreased the cost of fuel oil delivery by approximately twenty-five percent. Over fifteen hundred fuel oil companies use this method of delivery.

In the automotive field Ventalarm Signal is standard equipment on most of the larger buses. As an indication of the acceptance, the Board of Transportation of the City of New York now operates twenty-two hundred buses equipped with the Ventalarm Signals. The Ventalarm Signal allows the attendant to fill at full pumping speeds to the proper predetermined level within the tank. This level provides security against expansion spillage. Approximately one million passenger cars will be equipped with Ventalarm Signals in 1951. In the last few months special models designed to operate at the fast filling rates encountered in diesel locomotive fueling have been placed on the market. Great interest has been indicated by the safety and insurance departments of the railroads. They are extremely conscious of the hazards due to the spillage. The operating departments recognize that spilled fuel is not only wasteful, but poor housekeeping. One of the largest eastern railroads has now equipped over one hundred twenty-five locomotives with Ventalarm Signals. Tests by many other railroads are now in progress. The Ventalarm Signal is a positive signal. It starts to signal with the first gallon pumped. It is unique in that it has no floats, no electric wiring and beyond the lifting of a brass valve, no moving parts. Yet this simple device will allow an attendant to fill a fuel oil tank blindly, day or night, with the assurance that the cessation of the whistle will advise him when the level within the tank has reached the proper predetermined point. There is only one direction necessary "fill 'til the whistle stops."

To operate properly the Ventalarm Signal must control all the venting vapors. A sensitive whistle, which will signal at pressures as low as one-half ounce per square inch is in series with a signal vent which originates at a predetermined point below the top of the tank. Relief means are provided so that whenever the pressure within the tank exceeds approximately 4 ounces per square inch the additional venting vapors are by-passed around the whistle, so that the whistle itself is never subjected to excessive pressures. There are three main elements in the Ventalarm Signal, (1) the whistle, (2) the relief valve, and (3) the intrusion. In the standard type these three elements are incorporated in one unit. The standard type Ventalarm Signal is installed on top of the tank in series with the main vent, and the signal is transmitted out through the main vent pipe. In the remote type, the whistle is placed at the termination of the separate signal vent. In the remote type the relief means are incorporated in the main vent. The signal vent originates from within the tank, either by an intrusion from the top of the tank, or by an entry into the tank at the side or end, close to the tank top. A unique feature of the Ventalarm Signal is that it creates an automatic by-pass in case the signal should be ignored and fuel discharged through the main vent. In no case are excessive pressures created in the bank. The widespread acceptance of the Ventalarm Signal throughout the petroleum and automotive industries indicates that it may offer some advantages in diesel locomotive fueling. For more detailed information on The Ventalarm Signal, write DIESEL PROGRESS, File 85, P.O. Box 8458, Cole Station, Los Angeles 46, California.

VENTALARM PRESSURE RELIEF VALVE ASSEMBLY (For 2" Vent) (Part DL-121)
"STOP" to limit travel of Relief Valve.
RELIEF VALVE
VALVE GUIDE


MAIN VENT (Sound is transmitted to exit of main vent)
VENTALARM SIGNAL (For 2" Vent) (Part No. DL-117)
"STOP" to limit travel of Relief Valve
WHISTLE (no moving parts)
RELIEF VALVE
VALVE GUIDE
INTRUSION (Intrusion, Valve and Whistle are in one assembly)
WHISTLE STOPS when liquid rises to bottom of intrusion.

Cutaway view of the standard type Ventalarm signal.

SIGNAL VENT
MAIN VENT
REMOTE VENTALARM SIGNAL (For ½" Signal Vent) (Part No. DL-122)
WHISTLE (no moving parts)
RELIEF VALVE
SCREEN
COMBINATION PRESSURE RELIEF AND INTRUSION ASSEMBLY (For 2" Vent) (Part No. DL-126)
SIGNAL VENT INTRUSION
WHISTLE STOPS when liquid rises to bottom of intrusion.

Pressure relief valve assembly for use in alternate method of remote type installation.

The remote type Ventalarm signal with separate signal vent.

Takes Presidency

Kenneth S. Thomson

Mr. Kenneth S. Thomson, presently executive secretary of the Cleveland Association of Credit Men, was elected president of the Sterling Engine Company, Buffalo, N. Y. Mr. Thomson's appointment by the Sterling Board of Directors brings further recognition to an already successful career. Born in Scotland, Mr. Thomson came to the United States 35 years ago and made his home in California. He has successively been engaged in the food, ranching and ceramic industries in addition to serving as financial advisor on the board of a number of manufacturers. A very active and much traveled man, he is not only sought after as a speaker but is also the author of two books.

In World War I, Thomson served with the U. S. Engineers in France and was with the Valuation Division of the American Commission to Negotiate Peace at Paris in 1919. He will resign his executive position with the Cleveland Association of Credit Men at once to assume his new duties with Sterling. The Cleveland Association provided credit and financial management service to its membership of some 800 manufacturers from 36 northwestern Ohio cities. It was also announced that Leslie D. Calhoun would become vice-president in charge of engineering. Harold W. Burkett will continue as secretary and treasurer of the company. Both have been with Sterling for some time past in similar capacities and are well known in the diesel and gasoline engine manufacturing industry.

In addition to Mr. Thomson, the Sterling Engine Company Board of Directors is comprised of the following: L. W. Metzger, Mid Vale Co., Philadelphia; M. G. Shevchik, Elliott Co., Jeannette, Pa.; W. R. Forsythe, Ohio Crankshaft Co., Cleveland; I. F. Felt, financier, New York City; B. L. Claybaugh, financier, Harrisburg, Pa. and Addison F. Vars, National Associated Industries, Washington, D.C. F. G. Raichle, prominent Buffalo attorney, will continue as general counsel.

Executive Promotions by De Laval Steam Turbine Company

James P. Stewart — Wencel A. Neumann

The Board of Directors of the De Laval Steam Turbine Company, Trenton, New Jersey, has announced the election of Mr. James P. Stewart as president and Mr. Wencel A. Neumann, Jr. as vice president of industrial sales. Mr. Stewart had previously served as executive vice president. Mr. H. G. Bauer has been elected vice president of engineering and will also continue as manager of marine sales. Mr. Charles A. Jurgensen has been elected vice president of manufacturing and will continue to serve as works manager.

Mr. Stewart came to the company in 1946 after seventeen years capital goods experience in engineering, production, sales and executive positions. He was elected executive vice president of De Laval in 1949. A mechanical engineering graduate of Cornell University, he is a member of several professional engineering societies. At present he also is president of the Hydraulic Institute, a trade association of the pump manufacturing industry.

Mr. Neumann, the new vice president of industrial sales, has been associated with De Laval since 1946 and most recently as manager of the IMO-De Laval Products Division. Previously he was with Westinghouse Electric Corporation and also served as an officer in the U. S. Army Ordnance. He is an engineering graduate of the University of Michigan and is active in several industrial associations. Mr. Bauer joined the organization in 1937 after extensive marine engineering and shipbuilding experience in Europe and this country. He has been associated with the marine activities of De Laval since he joined the company. Mr. Jurgensen joined the company in 1931 and has served in various supervisory and executive capacities during this time. Since 1948, he has been works manager.

Zero-Lash

HYDRAULIC VALVE LIFTERS

—automatically maintain zero clearance in the valve train at all times

Zero-Lash opens the door to:

- Cam design improvement for optimum engine operating efficiency.
- Freedom from loss of efficiency from varnish and sludge.
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- Longer and better service for valves and seats.
- Silent valve train operation.
- Smoother idling.

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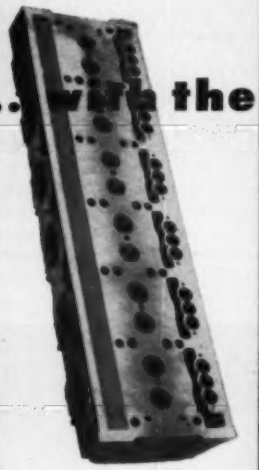

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in your own shop you can completely recondition your fuel injector nozzles and needles with the
SERVICE MASTER

- It is the first and only machine that will grind diesel injection nozzle seatings to manufacturers original standards. It will grind a point dead concentric with another portion and retain a predetermined angle to within a minute of a degree.
- The Service Master is quickly convertible for all forms of grinding within its capacity. It cannot lose its accuracy because all moving parts are adjustable to wear.
- *Sole manufacturers and patentees.*

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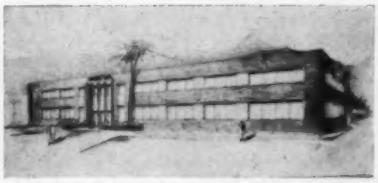
The MERLIN Service Master

THE MERLIN ENGINEERING CO. LTD. - Hebble Mills, Salterhebble, Halifax, England.

Moves Factory and Office

Announcement of the completion of the new Farr Company main factory and office building in El Segundo has been made by R. S. Farr, President. Movement of the company from its present factory on Southwest Drive in Los Angeles is now completed and full production has resumed. The new plant, necessitated by business growth, has more than double the former manufacturing area. The modern brick building was especially designed for the development and the production of Far-Air filters, evaporative coolers, railroad grilles, diesel engine air filter assemblies and allied air-conditioning equipment which are manufactured and sold nationally by the company. Facilities in the new plant include modern executive and general offices, a research laboratory that is one of the most complete in the industry, a spacious engineering and designing department, as well as specially-planned, efficient manufacturing areas. The plant is located on a 10-acre site on Rosecrans Avenue near Aviation Boulevard, has a floor area of approximately 50,000 square feet and presently employs about 100 people. Further expansion on the same property is planned for the future. The company announced that plans for increased production will require additional employees and it is hoped that these can be obtained from the immediate area.

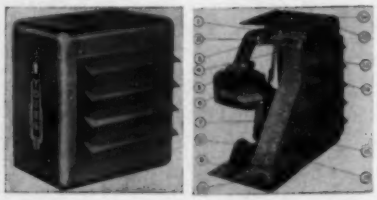
Plant Expansion



Investment of a million and a half dollars in a construction program covering new erection floor, expansion of present test facilities, manufacturing space, and machine tools by Roots-Connersville Blower Corp., Connersville, Indiana is announced by Mr. John B. O'Connor, Executive Vice President of Dresser Industries, Inc., Dallas, Texas, and Mr. Robert Owens, President of Roots-Connersville, one of ten Dresser operating companies. These new facilities will enable Roots-Connersville to test the largest centrifugal blowers and compressors ever designed, which it is now building. Roots-Connersville is now in the process of completing a large contract covering a ten-unit order of centrifugal compressors requiring 53,000 horsepower. The company is also building a group of the largest centrifugal units ever designed. This installation will be composed of six units. One unit of this group will require a total load of 56,000 horsepower on a single shaft. Compressors of this size and type handling tremendous and heretofore unprecedented large volumes of air and gas, open up many new possibilities, offering a tool for future large-scale industrial developments hitherto impossible to explore.

DIESEL ENGINE CATALOG came off the press last month in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and designers. ORDER COUPON ON PAGE 29.

Unit Oil Cooler



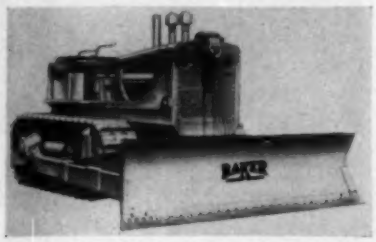
Here's one way to cool oil when water is at a premium and/or waste heat can be used to warm room interiors. It's a Young Unit Oil Cooler, manufactured by the Young Radiator Company of Racine, Wisconsin, and Mattoon, Illinois, specialists in heat transfer equipment. This compact unit, with attractive gray metallic casing, is available in nine models, of non-ferrous tube-and-fin construction, guaranteed for use with oil pressures up to 150 lbs. The cooling element is suported in the casing by special spring suspension to eliminate damage from expansion and contraction. The casing is of welded steel construction for ruggedness and freedom from objectionable vibration and noise. The Young patented agitator is said to increase heat transfer 100% by breaking up the flow in such a manner that the oil is constantly wiping the tube surface for maximum heat transfer. For further details, including dimension data, construction features, write for Young Catalog No. 3550.

Managers Named

Mr. George C. Rodgers and Mr. Irving W. Clark have been named Managers of the respective Military Sales Departments of the American Air Filter Co. operations in Moline, Ill. and Louisville, Ky.

Mr. Rodgers will manage the Military Sales Department of the Herman Nelson Division, in Moline, Illinois, where the Company manufactures Portable Heaters, Portable Ventilators and other heating and air handling equipment. Mr. Irving W. Clark will be in charge of the Military and Special Contracts Department at Louisville, Kentucky. While the Air Filter, Dust Control and Engine and Compressor Divisions of Louisville are producing a substantial volume of standard products for the Military, the Company is expanding its Defense activities with additional contracts for other military and special engineered products.

Cable-Control Mountings Redesigned



Redesign of cable-control mountings for the new and larger line of bulldozers, gradebuilders and root rippers developed to match the new and more powerful Allis-Chalmers crawler tractors, is announced by The Baker Manufacturing Company of Springfield, Illinois. The new cable models are for the A-C HD-9, HD-15 and HD-20 tractors. Baker is the only manufacturer producing a cable unit for the HD-9. Baker also recently brought out a larger line of engine-mounted, hydraulic control 'dozers, gradebuilders and root rippers for the full A-C crawler line, including the smaller HD-5. Redesign of the cable-control mounting provides maximum visibility, streamlined appearance, easy interchangeability, improved protection for cables and radiator and new push beam power tilt. The low frame cable mounting provides streamlined appearance with greatest visibility, Baker officials point out. The cable is located under the fender, close to the side of the tractor, well protected from brush and limbs. The built-in radiator guard with perforated grill is a part of the cable frame.

Quick, easy interchangeability between 'dozer, gradebuilder and root ripper is provided by removal of a bolt on each side, removal of wedges and detachment of the lower sheave block at the front. The new power tilt eliminates need for jacks or pry bars to raise or lower the push beam. Reverse tilt of the moldboard also is accomplished by power, rather than manual effort. The "Roll Action" design of all Baker blades, which leaves more of the tractor power for push and maneuvering, is retained in all models, Baker points out. The entire line of Baker tractor attachments is described in Baker Catalog No. 895, while detailed specification sheets on each model are available separately upon request to the Baker plant or to Baker, Allis-Chalmers dealers.

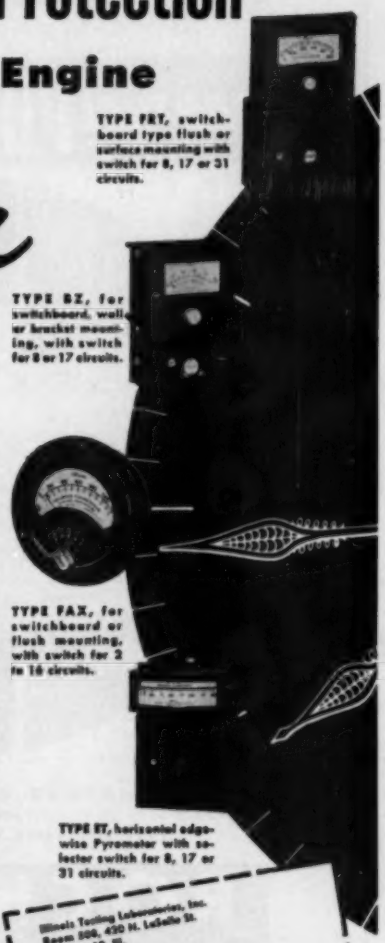
Round-the-Clock Protection

for your Diesel Engine

with

Alnor

PRECISION PYROMETERS



TYPE FRT, switchboard type flush or surface mounting with switch for 8, 17 or 31 circuits.

TYPE BZ, for switchboard, wall or bracket mounting, with switch for 8 or 17 circuits.

TYPE FAX, for switchboard or flush mounting, with switch for 2 to 16 circuits.

TYPE RT, horizontal edgewise Pyrometer with selector switch for 8, 17 or 31 circuits.

Every day that brings more material shortages makes your present diesel more valuable. Parts may soon be hard to get, and breakdowns will be more costly. Under such conditions, your diesel should have the ultimate in protection. Alnor precision-built pyrometers bring you round-the-clock protection . . . assure first-rate engine performance . . . first-rate profits.

Alnor pyrometers give an instant check on individual exhaust temperatures, anticipate trouble from pre-ignition, detonation, overloading or breakdown of lubrication. Such continuous protection reduces maintenance time and expense to a minimum—increases efficiency and operating economy. That's the type of protection so many diesel manufacturers are seeking when they specify Alnor pyrometers as original equipment.

Ask your Alnor representative now about these rugged, low-cost instruments. He'll be glad to help you choose the type of Alnor pyrometer and thermocouple exactly suited to your requirements. In the meantime, send for bulletin 4361, describing the complete pyrometer line—use this handy coupon.

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Diesel Progress Award Announced

The second annual conference of operators of REA-financed generating plants was held at Des Moines, Iowa from May 22 to 25 with about 100 plant operating men, diesel industry representatives and REA staff personnel present. Twenty-eight electric cooperatives were represented at the meeting, of which 25 have diesel generating plants.

The first public announcement was made at the meeting of an annual award by DIESEL PROGRESS to the most efficiently operated of the 150 odd REA-financed diesel generating plants. The announcement was made by James B. McCurley, chief of the REA power division, who read a letter from Rex W. Wadman, editor and publisher of DIESEL PROGRESS. The award, an attractive bronze plaque, will be made to the plant whose records show the optimum conversion of heat units to electrical units during the calendar year, and will be retained by the winning plant each year.

The first award will be made on the basis of the plant records for 1951 and will be presented at the next annual plant operators' meeting. Throughout the year, an Honor Roll of the 10 most efficient plants will be published, based on monthly reports. The primary purpose of the conference was to exchange information and experiences on operation of electric generating plants in order to help all the operators get the most from their equipment.

A highlight of the meeting was a visit to the combination diesel-steam plant of the Southwestern Federated Power Cooperative at Creston, Iowa. The diesel section was first energized in November, 1948, with an installed capacity of 5,788 kw., consisting of two 1,100 kw. Cooper-Bessemer, and three 1,196 kw. Enterprise units. All five units are dual fuels. This plant has an excellent operating record, and during the visit was called one of the best maintained and operated plants among the REA borrowers.

Left to right: Dexter Smith, plant superintendent, and Floyd Ressler, diesel maintenance supervisor, Cornbelt Power Cooperative, Hombolt, Iowa.

Until the 15,000 kw. steam plant section went into operation in April, 1951, the diesel generating section supplied the electrical needs of the co-op, which is a federation of five electric distribution cooperatives. The steam plant now carries the base load, with the diesel plant taking the peaks and providing standby protection. The diesels, which can be put on the line almost immediately have already proved their worth in contributing to uninterrupted electric service.

Left to right: Ed Allison, engineer; Wren Malone, engineer; John Sheumer, and L. J. Robbins, all of Enterprise Engine and Machinery Company; John J. Hyde, manager, Southwestern Federated Power Cooperative, Creston, Iowa. Enterprise diesels in background.

The Cooper-Bessemer engines are model LS8-TGD, turbo-charged, dual fuel, eight-cylinder, 15.5 inch bore, 22-inch stroke, 327 rpm., 1,575 bhp., connected to an Ideal generator, 1100 kw. at .8 power factor, 1,375 kva. The exciter is an Ideal, 20 kw., 1,750 rpm., and chain driven. The Enterprises are model DGSQ-318, turbo-charged, dual fuel, eight-

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Size? Type? Drive? Torque? Engagement? Overload? Pick-up? Shock? Slippage? Vibration? Grabbing? Chattering? Mounting? No matter what your power transmission problem, there is a ROCKFORD CLUTCH that will solve it. Rockford clutch engineers are in a position to specify a size and type clutch that will meet your needs exactly. Send a print, with a description of your clutch problem, for their specific recommendation.

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ROCKFORD CLUTCHES

cylinder, 16-inch bore, 20-inch stroke, 360 rpm., 1,682 bhp., connected to an E. M. generator, 1,196 kw. at .8 power factor, 1,495 kva. The exciter is an E. M., 15 kw., 1,750 rpm., and chain driven.

Left to right: William V. McCray, power operations section, power division, REA; Charles G. Cooper, Cooper-Bessemer Corporation; Everett Rauschenberger, head, internal combustion and hydro plants section, power division, REA; Gustave Helmholtz, power operations section, power division, REA.

Also announced by Mr. McCurley were plans for REA to offer a uniform correspondence training course for diesel plant operators. Scheduled talks by industry representatives, operating men and REA staff officials covered such subjects as practical preventive maintenance, generating plant housekeeping, governors, indicator cards and engine data, bearing and lubrication problems, and the cause and prevention of crankcase explosions. Plant operators who attended the meeting advanced several suggestions for the manufacturers and distributors of diesel engines. Among them were:

(1) Design changes to avoid the necessity of frequent bearing replacement.

(2) Controlled cylinder lubrication.

(3) Provision of information on shop and erection clearances with each engine.

Left to right: Marlin S. Stewart, manager, Chugach Electric Association, Anchorage, Alaska; John J. Hyde, manager, Southwestern Federated Power Cooperative, Creston, Iowa.

At the close, the operators expressed the opinion that the meeting had been beneficial and were pleased at the decision to make the conference an annual affair.

Building Integrated Tow

A group of men well-known on the Great Lakes as successful operators of Lake boats have placed an order with St. Louis Shipbuilding and Steel Co. for a high speed river tow consisting of 3200 hp. twin-screw towboat and three integrated barges each 290 ft. by 50 ft. by 12 ft. This tow is similar to a tow built by St. Louis Shipbuilding for Sohio Petroleum Co. and will have a pool speed of approximately 12½ miles per hour with a cargo of over 10,000 tons. The new organization to be known as Hutchjohn Towing Inc. is headed by Captain John M. Johnson, a retired Lake skipper who recently moved to St. Louis, Mo. from Geneva, Ohio. John T. Jaeger of the law firm of Johnson, Branand and Jaeger, is secretary and Gene C. Hutchinson, a partner of Hutchinson & Co., Rockefeller Building, Lake ship operators, is treasurer. The towboat will be powered with a pair of General Motors model 16-278A diesels equipped with Falk reverse-reduction gears. The barges will be equipped with heating coils for heavy oils, and each barge has a diesel driven turbine type deep-well pump for speed in unloading. Due for completion near the end of the year, this new tow will operate between New Orleans and Pittsburgh, the Twin Cities and Chicago.

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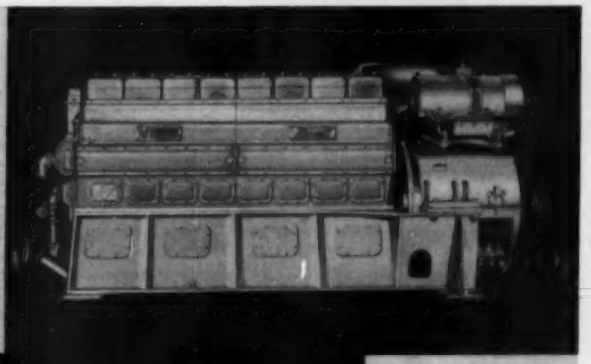

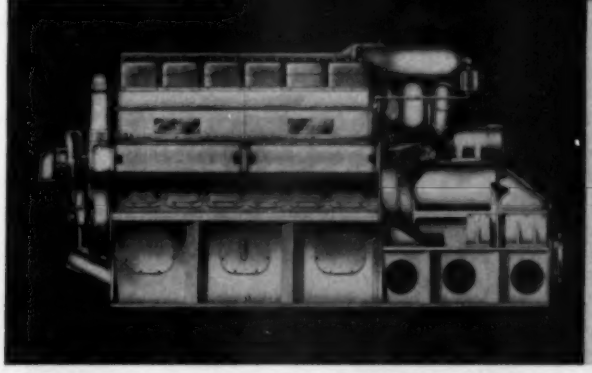

ABOVE

Sterling Viking Diesel 8 cylinder generator set rated at 600 KW.

LEFT

Sterling Viking Diesel 6 cylinder marine engine with reverse gear, rated at 565 HP in continuous service.

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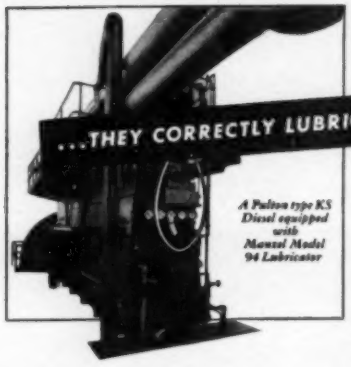

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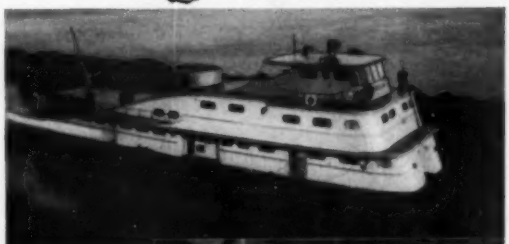

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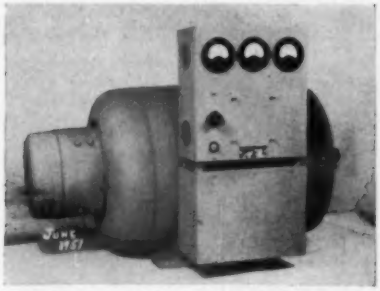

Here is a new high-frequency alternating current generator that is being manufactured by the Kato Engineering Company of Mankato, Minnesota. This machine has a capacity of 75 kva. and generates 400 cycles at 1714 rpm. It is of the revolving field type and the field coils are energized from a 125-volt dc. exciter that is direct-driven from an extension of the alternator shaft, the dc. exciter being mounted on the collector ring end-bell of the main alternator. The generator is furnished with an effective fan which provides a voluminous flow of cooling air and holds the temperature rise to less than 40°C. The main alternator shaft rotates on ball bearings which are pre-lubricated and will run several years without adding lubrication. The net weight is 1325 lbs.; overall length is 49 inches; height, 21½ inches; width, 21 inches. These dimensions are without outlet box or instrument cabinet.

These high-frequency generators are available in both single-phase and three-phase, the most common voltage being 110/220 volts, single phase, or on the three-phase, four-wire models, 120 volts, single phase; 208 volts, three phase. Frequencies ranging from 300 to 500 cycles are available by change in winding and change of operating speed. The Kato Engineering Company offers these generators both with engine-drive and motor-drive. The 28-pole machine is suitable for direct-connecting to a 1714 full-load rpm., squirrel cage induction motor. However, when so driven, there is a slight change in output frequency, due to normal slip of the low-slip type squirrel-cage induction motor that is usually furnished on complete motor-generator sets. Many sizes, however, are available with a three-phase, ac. motor that runs at absolue synchronous speed. These high-frequency generators are also available with variable speed which permits holding frequency at any pre-determined frequency, and it also permits voluntarily varying the frequency through any desired range such as from 380 cycles to 420 cycles. Generators designed for inherent regulation will give 8 to 10 per cent regulation with a non-inductive load, providing speed of generator is held within three per cent. An automatic voltage regulator is recommended on generators that are to operate an inductive load. On some special sizes, an automatic voltage regulator permits voltage regulation as close as 2 per cent with 80 per cent power factor.

Information as to wave-form deviation factor and harmonics is available upon written request. On motor generator sets where variable frequency is desired, the exciter is attached to motor, so as to

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have constant speed. To vary frequency within reasonable range such as 380 to 420, a mechanical arrangement is provided which permits controlling the frequency manually by turning a hand-wheel control.

Two Sales Divisions Created

John W. Babb James M. Thompson

To service the exanding oil and gas industry requirements in the Southwest, The National Supply Company recently announced the creation of two sales divisions with headquarters in Houston and Fort Worth. The Southwest Division, with headquarters at Fort Worth, consists of the 20 stores operated by the company in an area comprising Northern Louisiana, Southern Arkansas, East Texas, North Texas, West Texas, New Mexico and the Panhandle. James M. Thompson is division manager. The Gulf Coast Division, with headquarters in Houston, will be under the management of John W. Babb and will be comprised of the 15 stores in Mississippi, Southern Louisiana and the entire Gulf Coast region. Previously the entire area had been operated as one division. The company has served the area for 50 years, ever since establishing its first store in 1901 in Beaumont. The expansion in divisions, Naurice G. Cummings, resident vice president of National Supply in Houston, explained, is traceable to the need for speedier handling of requirements made necessary by the new discoveries and development of fields in Texas, where, with its neighboring states, more than half of current U. S. oil production is concentrated. Mr. Thompson, manager of the new Southwest division, had previously been manager of the Texas division. His headquarters are at 3109 Winthrop Street, Fort Worth. Mr. Babb, formerly district manager at Houston, has been with the company since 1936 and has been identified with the oil industry for the past 25 years. The new Gulf Coast division offices at Houston will be in the Commerce Building. National Supply also has in that city a manufacturing plant, retail store and warehouse on Navigation Blvd.

Names Three to Dallas Operation

Three additions to the staff of the newly created petroleum industry headquarters of the Burgess-Manning Co., at 1203 Dragon St., Dallas, have been announced by R. L. Leadbetter, vice-president in charge of the local engineering and sales office. R. H. Campbell, formerly purchasing agent and traffic manager for the Dallas Tank Company, has been named purchasing agent and traffic manager. W. C. Jack, also formerly with the Dallas Tank Company and previously chief engineer for the Texas Boiler Company, has been appointed design engineer. R. T. Oliver has been appointed sales correspondent to assist in the facilitating of field operations.

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The five separate sections break down as follows: (1) An engine section fully illustrated with complete technical descriptions and specifications. (2) An accessory section describing engine and plant accessories. (3) A transmission section describing torque converters, etc. (4) A classified buyers' guide giving you valuable information as to the source of many things you buy in this industry. (5) Advertising section.

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Inland River Reports

By DAVID I. DAY

MUCH NEWSPAPER comment greeted the *M. V. Claude Tully* on her June run up the Ohio with 75,000 gallons of alcohol in three barges. In running the old historic Oxbow Bends below Leavenworth, Ind., the boat was making remarkable time. In fact, she is undoubtedly one of the fastest of the inland towboats. Built recently at the St. Louis Shipyards, the *Tully* is powered by Fairbanks-More twin diesels rated at 3200 hp.

PETROLEUM PRODUCTS lead in shipments by river on the upper Mississippi this summer, followed closely in late June by coal cargo totals. At Keokuk, Iowa, in mid-June your correspondent observed the *St. Paul Socony*, 1760 hp. National Superiors; the *Wabash*, single engine, 510 hp., National Superior; the *Twin Cities*, 1180 hp., Fairbanks-Morse twins—all in line of march. Following were the *Ernest T. Weir*, the Ohio River favorite, now headed up to Minneapolis with oil propelled by her National Superior twins, 1300 hp.; the *Havana Zephyr*, 2000 hp., National Superiors; the *Stanolind A.*, twin Busch-Sulzers, 1200 hp.; and the *Floyd H. Blaske* with Atlas Imperial twins totaling 700 hp.

THE *MANCO*, sand and gravel boat, Havana, Ill., to Chicago is the newest on the Illinois River. She was built a month or so ago at Manitowoc Shipyards, Manitowoc, Wis., with a 6-cylinder Enterprise Diesel of 1150 hp. In command was Capt. Charles Partridge.

THE *CELESTE* of the Southern States Barge Line, St. Louis, is back at work in command of Capt. Carl McCandless. We noted her below Paducah resplendent with new paint. This 1610-hp. pusher has long been an active advertisement of Cooper-Bessemer engines.

THE VETERAN master-pilot of the Socony-Vacuum fleet out of St. Louis, namely Capt. Louis B. Nyhammer, is well pleased with the new 3200-hp. *LaCrosse Socony* recently completed by the St. Louis Shipyard & Steel Company. Being the initial master of the biggest of the "Socony red boats" is, indeed, an honor. The new boat is at work smoothly on the Mississippi, her twin General Motors (Cleveland) diesel engines giving a good account of themselves.

MOST RIVERMEN were surprised to hear of the sale of the *M. V. Wabash* by the Illinois Farm Supply Company, Kingston Mines, Ill., to the Apex Oil Company, St. Louis. The boat is at work in the oil trade, Helena, Ark., to Chicago. Built in 1935 at Paducah, the towboat has been a faithful performer. She is 60 x 17 x 6 in size, powered by a National Superior diesel, over 500 hp. In her Paducah days the boat was operated by the Roberts Towing Co., and was called the *Mary T.*

ONE OF THE most attractive of the new river towboats is the 86-ft. *Bull Durham* of the Bull Towing Company, built by the Nashville Bridge Company, Nashville, Tenn. She is running in the

upper Mississippi and Illinois River oil trade in command of Capt. Thomas Dunn. In the near future she will be pushing a special integrated tow of barges also to come from the Nashville yards. The boat is powered by twin Caterpillars, 1200 hp.

WE OBSERVED the *Harvey* at Nashville recently. It is often urged that this boat be bought by the diesel engine industry and kept as a museum piece. She is believed to be the first river boat powered by diesel engines—240 hp.; now by Fairbanks-Morse diesels, 420 hp. She was built in 1923 by Nashville Bridge Co.

DRAVO never did a better thing than when the company built the *M.V. Frank C. Rand*. This towboat of the Mississippi Valley Barge Line has been at work about four years and has always proven her power and maneuverability in all sorts of weather. We saw her recently headed up the Ohio with 14 loaded barges and several empties. The loaded barges carried coal, gasoline, scrap, pig iron, and fluorspar. The *Rand* is powered by twin National Superiors, 2000 hp.

ONE DAY back in the days of World War II we noted the *M.V. Jean Marie* headed down the Missouri from the old shipyards at Blair, Neb., with owning officials and their friends all having a good time. During the last seven or eight years the *Jean* has done a world of profitable work for her owners, the Lea River Lines. Time has treated her kindly. This triple-screw National Superior pusher went up the Ohio recently pushing five or six heavy barges of gasoline without complaint.

FINE NEWS comes from the upper Mississippi where the new *Meander* is at work for her owners, the Minneapolis Dredging Co. The boat has twin General Motors diesels, totaling about 550 hp. She was built by the Barbour Metal Boat Works, Lamay, Mo. Dimensions are reported as 47x14x5.

NOTED below St. Louis two sister boats, the *Bayou Orleans* and the *Bayou Plaquemine*. The former is a twin-screw, the latter a single-screw boat, both having General Motors (Cleveland) engines. We believe the veteran Capt. Jack Champion is in charge of the *Orleans* but we failed to learn the name of the commander of the *Plaquemine*. The *Orleans* had a routine engine room check-up in St. Louis the latter part of June and is really functioning in the transportation of gasoline and tractor fuel.

THE NEW *Mt. Vernon* is a pusher of much promise. Built at Jeffersonville Boat & Machine Co. yards for The American Barge Line, she is 120 x 34 x 11, powered by Cooper-Bessemer triplets, totaling 2160 hp. We observed the boat upbound on the Ohio with 115,000 barrels of oil. She is a most easily handled diesel vessel. Her pilots agree that she rates among the most easily maneuvered boats on the inland rivers.

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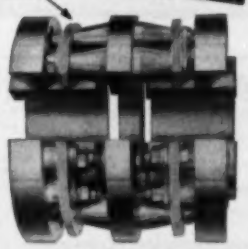

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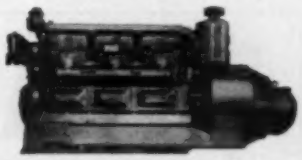

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West Coast Diesel News

By FRED M. BURT

THE NEW 105-foot tuna clipper *Favorite*, recently completed by Puget Sound Boat Bldg. Co., Tacoma, for Antonio Rosa and Associates, San Diego, is powered with a 600-hp. direct-reversible, Enterprise diesel; for auxiliaries, two General Motors 165-hp. diesels driving 75-kw. generators.

FOR PIKE DRILLING CO., Los Angeles, two new Cummins LP-600, 250-hp. diesels to power drilling rig in Southern Calif. operations—an innovation is the use of two Vapor Phase units for cooling to supplement the orthodox radiator system.

THE NEW Kettenburg-38 *New Endeavor*, purchased by E. F. Burrington & Son, Long Beach, for the albacore season, is powered with a 3-cyl. G. M. diesel, ad while recently drydocked in Wilmington had a 10-hp. Crofton diesel added as an auxiliary to operate refrigeration system and bait pumps.

FOR THE 3,000 car underground garage under construction in Pershing Square, Los Angeles, two 6-cyl. 165-hp. General Motors diesels, driving 75-kw. GM generators. Located on the lowest level, these units, with automatic starting in case of city power failure, will supply emergency light and power.

WITH THE RETIREMENT of Geo. Simson from active management of Simson-Maxwell, Ltd., Vancouver, B.C., distributors of Buda and Cooper-Bessemer diesels in British Columbia, (though continuing as a director) Robert Maxwell is president and managing director; Dal C. Smith, vice-president; and Hugh T. Radelet, secretary-treasurer.

NEW BUDA diesel engines installed in logging trucks in Oregon—in a West Coast model International a 215-hp. unit for Brooks-Scanlon, Inc., Bend, Ore.; a 215-hp. Buda in a Kenworth for E. K. Wood Lumber Co., Scottsburg; and six more of the same diesels replacing gasoline engines in six Federal trucks for Harris Pine Mills, Pendleton.

A NEW 38-foot 6-inch x 13-foot combination boat for M. Calandrino, San Jose (the *Martha Jane*) under construction by D. LaBruzzi & Son, Oakland, Calif. will be powered with a 165-hp. General Motors diesel.

BUNKERING THE large salmon freezership *Alaska Reefer* with 54,000 gal. of Associated diesel fuel, 50 drums of Tydol lube oil, and 10,000 gal. of Flying A gasoline (to fuel the Nordberg engines powering 10 gillnetters) was the first fueling job of the new Hy-C-Tane marine station next to the new Municipal Fish Markets at San Pedro.

FOR A NEW unit at the Standard Oil Co. (of Calif.) refinery, El Segundo, three 880-hp. Clark gas engine driven compressors (8 cyl. high compression) to be used to pump gas at 1,000-psi, without pressure cylinder lubrication, to avoid contaminating the catalyst.

TO RE-POWER halibutter *Golden North*, a new 150-hp. Cummins diesel, for owner Harvey Leask of Metlakatla, Alaska.

THE SECOND unit of its kind installed at the Arizona-Edison power plant, Yuma, Arizona, is the new Cooper-Bessemer 3700-hp. L-S-V-16 diesel driving a 2500-kw. Westinghouse generator.

BUDA DIESEL units recently delivered to The D & G Lumber Co., Waldport, Ore.—Skadgit BX-200 yarder with 280-hp. engine; Oliver Cletrac re-powered with 215-hp.; Buda 30-kw. diesel generator to power sawmill's green chain, cut-off saws, and conveyor; a 350-hp. diesel for the headrig and edger, same mill.

FROM ANDERSON-O'BRIEN CO., Los Angeles, for Standard Oil Co. of Calif. for use on drilling rigs at the La Habra field—General Motors diesel units; two twin fours (200-hp.) each; two twin sixes (300-hp.) two 40-kw. diesel-electric sets—all of these units have the new G.M. natural gas equipment to provide a duel fuel set-up.

INSTALLED IN the 37-ft. commercial fishing boat *Venezia* operating out of San Diego, owned by Don Corona, Pete and Joe LaGrasso, a Pacific Diesel Model 265, 60-hp., (3:1 reduction gear), operating at 1600 to 1800-rpm. Boat will carry 10 tons of albacore or tuna, fuel capacity 600 gallons of amber fuel, for a range of about 10 days or 2000 miles.

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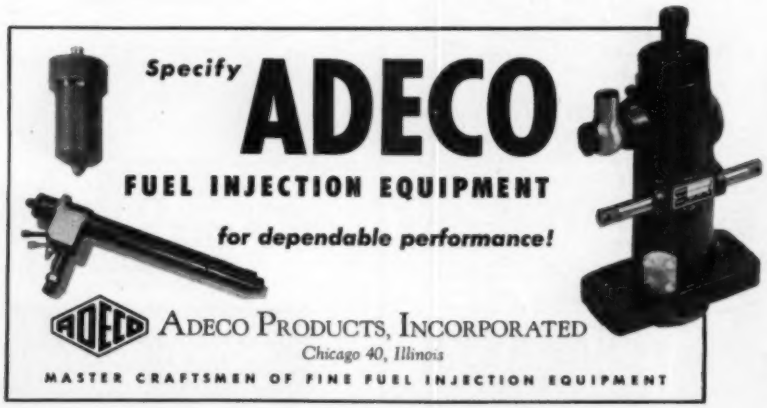

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APPLETON - WISCONSIN

THE LATEST tuna clipper to be powered with a Union diesel is the *Evelyn R.* now on her maiden fishing voyage, fitted with the new model V6, naturally-aspirated, 560-hp. at 325-rpm. diesel.

A CALIFORNIA Earth Boring Machine, built by California Welding & Blacksmith Shop, Los Angeles, shipped to Ravello Construction Co., Rio de Janeiro, Brazil, is powered with a 190 hp. Waukesha diesel purchased from dealer, Frazier-Wright Co., of Los Angeles.

UNDER CONSTRUCTION at Puget Sound Boat Bldg. Co., Tacoma, is the 107-ft. tuna clipper *Columbia* for Frank Perry and Ed Madruga of San Diego; to be powered with a 600-hp. Cooper-Bessemer diesel; as auxiliaries, two Model 6-110 G.M.-Detroit diesels direct-connected to 100-kw. generators.

WITH MOST of the work done in the prison under supervision of Union Diesel Service Engineer Paul Allen, the 16-year-old Union diesel has just been rebuilt. It powers the ferry-boat *James V. Bennett* which keeps the McNeil Island (Wash.) Federal Penitentiary in contact with the mainland.

EVANS ENGINE & EQUIPMENT CO., General Motors diesel distributor in Seattle has doubled its dock facilities to accommodate the many vessels using GM diesels. Space is provided for both overhaul and new installations.

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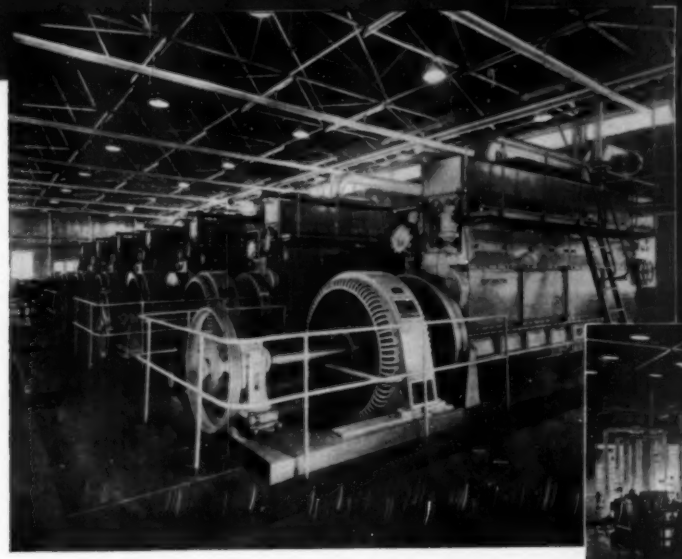

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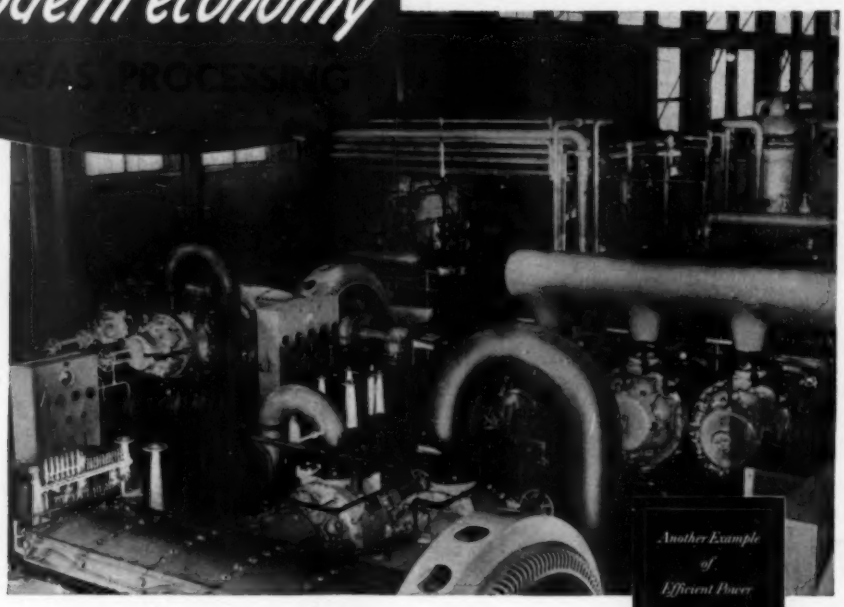

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